

CRYPTOZOOLOGY

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WHAT IS CRYPTOZOOLOGY?

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ABSTRACT: Cryptozoology is the science of "hidden" animals. While paleontology discovers and describes organisms of the past, cryptozoology attempts to do the same with unknown animals of the present. Cryptozoological reconstructions are no more fantastic or illegitimate than those of paleontology. Modern zoology does not accept many species, the evidence for which fails to fulfill certain conditions, thus banishing them to "non-existence." Science must rely on three kinds of proofs: autoptical, testimonial, and circumstantial, and all are subject to question. The life sciences pretend to rely more on autoptical proofs, which is illusory, since evolutionary theory itself is based only on circumstantial evidence. New facts are never accepted easily, but familiarity ultimately results in conviction, habit rather than logic being the determining factor. Common objections to cryptozoology can be disposed of easily. The inventory of large animals in both aquatic and terrestrial environments is far from complete, and the mammals of Africa, Asia, and South America are poorly cataloged. The role of mythology is important, as hidden animals lend themselves easily to forced mythification. The task of cryptozoology consists of demythifying the content of information in an attempt to help make the inventory of the planet's fauna as complete as possible.

Before attempting to define what cryptozoology is, let us begin by making clear what it is not. Cryptozoology is not an arcane or occult zoology, as some, in an attempt to discredit it, have suggested. It is no more an occult science than is paleozoology the ancient science of animals, or paleontology (from the Greek *palaios*, old, *ontos*, beings, and *logos*, discourse) an archaic or obsolete study of past living organisms. In the late 1950's, I coined the term "cryptozoology" from the Greek roots *kryptos* (hidden), *zoon* (animal), and *logos* (discourse), and it means simply "the science of *hidden* animals," just as paleontology is "the science of *ancient* animals."

But what are "hidden animals?" They are those more generally referred

to as "unknowns," even though they are typically known to local populations—at least sufficiently so that we often indirectly know of their existence, and certain aspects of their appearance and behavior. It would be better to call them animals "undescribed by science," at least according to prescribed zoological rules (to which we will return later). These animals are truly "hidden" in much the same manner as those species of the past which, after numerous genetic transformations, gave birth to the species of today. We know that such ancient species *must* have existed, but we have yet to find the fossil remains of many of them, and hence their relationships with animals both living and extinct are only dimly perceived.

Paleontology has brought to bear increasingly subtle methods for systematizing and accelerating the discovery and description of animals of the past. Cryptozoology has now set for itself the same task in regard to those living animals which have so far resisted all our attempts at capture or collection. It could very well be, of course, that certain of these hidden animals are indeed known, but only in fossil form. They may be representatives of "extinct" species whose survival is simply unrecognized. In this case, "hidden" would be more appropriate than "unknown."

CRYPTOZOOLOGY AND PALEONTOLOGY, SISTER SCIENCES

There are strong parallels between cryptozoology and paleontology. Just as paleozoology, the paleontology of animals, searches for and studies animals lost in a "time dimension," cryptozoology is devoted to the search for and study of animals hidden in a "space dimension." These two sister sciences, then, are engaged in the joint exploration of our world to aid in completing its inventory of fauna, but they do so along different dimensions and with somewhat different emphases.

Both disciplines are founded on the *exception*: in one case on fossilization, a rare phenomenon which only occurs under the right environmental conditions, and in the other on the fortunate visual observation of usually elusive or well-camouflaged animals. Both depend on reconstructions—through interpolation, extrapolation, or conjecture—on the basis of incomplete data: usually fossil fragments or prints in the case of paleontology, and fragmentary remains or traces in the case of cryptozoology (tufts of hair, feathers or scales, feces, blood, tracks, damage done to other animals or the environment, photographs or acoustic recordings, etc.). Above all, cryptozoological reconstructions depend on the simple accumulation of concurrent eyewitness testimony, which might well be considered the sensory stimuli retained in the memories of the observers.

The precision of reconstructions in cryptozoology is the only one subject to positive verification, since it may be possible to actually find a "hidden" animal, including its soft tissue, and examine it at leisure following its capture

or collection. While it certainly happens in paleontology that additional fossil material becomes available, as in the case of *Dinornis*, it is impossible to go back in time to examine the living animal itself. Occasionally, however, such specimens may come *forward* in time, and we may examine them entirely and almost perfectly preserved (as in the case of the Siberian mammoths, which were protected from spoilage by frozen peat ground, or the hairy rhinoceroses of Galicia, which were "pickled" in mineral wax, or insects enclosed in amber). Also, we sometimes discover, through primitive drawings or sketches, old but accurate representations of fossil animals, which provide information about their external morphology. Finally, we may be lucky enough to discover an actual living representative of a group thought to be extinct, of which the coelacanth is the best-known example, although there are dozens of others.

The hypotheses and reconstructions of cryptozoology (regarding animals actually alive) are no more daring, questionable, fantastic, or illegitimate than those upon which paleontology has based its reconstruction of the fauna of past ages. The vested interest of those who argue the reverse is shown by the following case. It seemed perfectly legitimate to give the scientific name of *Chirotherium* to a fossil genus known only by its tracks, found in Germany, England, France, Spain, Italy, and the United States, and of which some 20 species have been described. Yet, at the same time, it seemed ridiculous, premature, and absurd to describe scientifically the Himalayan Yeti, known *not only* by many tracks not identifiable with any known animal, but also by morphology and behavior as related by numerous eyewitnesses, and about which one can compile a coherent set of indicators which converge on a scientific description. Furthermore, this description makes perfect sense from the perspective of anatomy, physiology, ethology, and ecology.

THE NECESSITY OF PARATAXA

Conscious of an irregular situation, certain paleontologists have argued against the application of traditional Linnaean nomenclature to discrete parts or life-stages of animals which are deemed to be unidentifiable in terms of the whole animals to which they belong, especially since such animals could well be unknown. This same concern extends to fossilized tracks which can rarely be attributed to precise varieties (species, even genera) known only by their fossil skeletal remains.

For this reason, Raymond C. Moore and P. C. Sylvester-Bradley (1957) proposed that such traces be named *parataxa* (as distinct from *taxa*, usually reserved for identifiable varieties), and that a separate system of classification be created for the former. In his *Principles of Animal Taxonomy*, George Gaylord Simpson (1961), deplored the fact that this very sensible proposition did not receive official recognition: "All of paleontology

is based on parts, only, of animals and it would be a crippling blow to evolutionary biology if regular biological classification were not attempted, at least, in all cases."

My own feeling is that it deals an equally paralyzing blow to evolutionary biology not to do as much to classify those animals whose remains we do not yet possess, but about which we nonetheless possess a coherent dossier of reports. I also wish that the International Commission on Zoological Nomenclature would make official the notion of *parataxa* not only for the classification of unidentifiable fossil fragments or tracks, but also for animals known only by traditions, reports, or ambiguous physical evidence. It is indefensible, from the point of view of epistemology, to have a double standard for classifying animal species, according to whether or not they have become extinct.

Having thus noted the many similarities which exist between paleontology and cryptozoology, it is evident that the methods and techniques of the former, which have continued to develop and multiply since the beginning of the science at the start of the 19th century, will often be valuable for the latter. Reciprocally, one can argue that the procedures and theories of cryptozoology, which I have tried to put into practice since the 1950's, open the door to certain novel applications for paleontological research.

THE EQUIVALENCE OF EVIDENCE BEFORE THE TRIBUNAL OF SCIENCE

Even if the notion of *parataxa* is not officially recognized, one important point is worth emphasizing: the requirement of a type-specimen for the legitimation of the existence of an animal species, even if constituted by a simple anatomic fragment (as is sometimes the case in paleontology), is an arbitrary rule, founded solely on a recently established convention. The older zoology tried to describe *all* the animals with which men had acquaintance. It would admit the existence of *any* new species, provided its description allowed it to be recognized, and the group to which it belonged was stated. Since 1930, more bureaucratic (and, in a sense, more ruled by prejudice) contemporary zoology no longer accepts those species which do not fulfill certain very strict conditions.

It was the creation of the International Code of Zoological Nomenclature—whose utility is unquestioned—which, as an unexpected and undesirable consequence, resulted in the expulsion of animals not meeting the necessary conditions for a description "according to the rules." By a somewhat tortuous logic, many persons have concluded, because of the "ban" on naming these animals scientifically, that they do not exist! Somewhat less obtuse persons advise waiting for the capture of a first specimen before proceeding to admit a new species; they suggest remaining at a kind of balance point, a suggestion which can only appear as ignorance coming from specialists in the science

of animals. This sterile suspension of activity—and its excessive and unjustified "prudence"—should be condemned.

In its quest for truth, science bases itself essentially on reason. (This certainly does not mean that everything can be known by reason and only by reason, or that nonrational knowledge should be ignored and neglected.) It must also be noted that science can never reach an absolute and objective truth; it nonetheless aspires to the most *convenient* description possible of the Universe in the present state of knowledge, as Henri Poincaré (1906) most judiciously argued. Hence, science should utilize *all* the resources put at its disposal by the world of phenomena, as long as they can be treated in a logical manner. Scientific workers should not make premature choices, nor decide against any method of investigation which is based on reason.

To establish the reality of an object or event, science—like the courts of law—has three possible types of proof: autoptical, testimonial, and circumstantial. As the great legal authority John Henry Wigmore (1935) sensibly put it, there simply are no others.

Autoptical proofs are those which all individuals can see at will with their own eyes (from the Greek *auton*, self, and *optike*, art of seeing), or can touch, smell, and taste; in short, experience through their own senses: material objects or actions taking place at the present moment. *Testimonial* proofs are those based on testimony, the description of observations presumably made by other persons. As for *circumstantial* proofs, they depend on the coherence of pieces of evidence, which, *taken together*, complete and corroborate each other.

Contrary to what one might be tempted to think, *all* these forms of proof are equally subject to question, and "material" proofs are far from being the most solid or worthy of belief: they prove nothing but their own existence, and, furthermore, they can be altered or faked. In a court of law, where the life of a defendant may be at stake, decisions are practically always based on circumstantial evidence. Edwin M. Borchard (1932) showed that, in 80 percent of the cases examined, judicial errors (those that were detected) were due to testimonial evidence (mistaken identifications or perjury), and that autoptical proofs were not admissible in a case of murder: if the crime takes place in front of the judge and jury, the latter immediately become witnesses!

The sciences base themselves on *all* forms of proof. By the nature of things, the physical sciences (chemistry, physics, nuclear science, wave mechanics, astrophysics, etc.) seldom require recourse to autoptical proofs. Beyond a certain scale, the object of their investigations, whether enormously large or minutely small, is beyond the reach of the organs of sense, even when considerably enlarged with the help of instruments. The fundamental particles and the waves of matter are only known through their *effects*; the structure of the Universe cannot be conceived except through mathematical

models, and the nature of celestial bodies is inferred only from the luminous spectra they emit. The earth sciences (geology, geophysics, etc.) must have recourse to the same kind of inferences once they go beyond the Earth's crust: the nature and composition of the interior of our planet are known essentially by the study of seismic shocks. Among the social sciences, prehistory and archaeology are founded on material objects, but these are typically used as circumstantial evidence (as are exhibits in a court of law), and history depends largely on testimonial proofs, e.g., the archives and reports of the chroniclers of the period.

Only the life sciences, in particular paleontology, zoology (as well as its subdivision, bioanthropology), and botany, seem (or pretend) to depend upon autoptical proofs. Their workers refuse to believe in the existence of a species, or at least to ratify it, without the evidence of an unequivocal material specimen. Not only is this requirement unjustified on epistemological grounds; it is also illusory. Whether one wishes it or not, it must be recognized that evolutionary theory itself, which dominates and illuminates all contemporary biology, is strictly founded on circumstantial evidence. We do not possess the least autoptic proof of macroevolution, nor is it established through experimental science, of which so much is made. Experimental science, in fact, is only the means for transforming circumstantial and testimonial proofs into autoptical proofs. What many seek to present as the sole *true* science is only one side of scientific research, perhaps only a facet. It is quite wrong to pretend, as many self-styled rationalists have readily done, that the only science worthy of the name is the sum of facts which can be reproduced in a laboratory. This is only true of a tiny minority of elementary and basic phenomena.

In biology, a whole gamut of types of knowledge—notably most studies in ethology and even ecology—repose *entirely* on testimonial evidence: the reports of field observers, which are seldom accompanied by photographic documentation (and, above all, by motion picture films) which illustrates the behaviors described and the situations analyzed. Such “material proofs” are nonetheless susceptible to tampering, as those already incredulous never miss emphasizing when it is a question of unknown animals or unusual behavior.

Although it may not always be evident, new facts are usually not accepted without opposition by the scientific community unless they fall within certain parameters, possess a reassuring banality, and are not radically new. When they are truly novel, they will be accepted only in the long run—perhaps after about 30 years, the space of a generation (Lumière 1941)—when a certain consensus is reached, familiarity allowing them to be reconciled, little by little, with previous knowledge viewed as well-founded. Evidential proofs play only a secondary role in the process, and only the obstinate accumulation

and repetition of the new facts permit them ultimately to bring about conviction. Routine and habit, not reason and logic, are the determining factors. As we have already stated, nothing is absolutely true: every fact acquires only a greater or lesser degree of probability.

It is due to this statistical character of truth that the scientific community's acceptance of new facts or original theories is as fluctuating as the measure of popularity of a politician as determined by the opinion polls.

SOME COMMON OBJECTIONS

It is easy to dispose of the most common objections to cryptozoological research. First, it is argued that, the planet being today well-known, explored in its most remote recesses, there is but a small chance of discovering unknown animals. It is correct that the amount of *Terrae incognitae* has receded in the course of the centuries. It is also true that there remains on the maps a powdering of “white patches,” as is shown by the occasional discovery of a mountain, a great river, an important waterfall, or an island previously unnoticed. There are two regions, furthermore, whose exploration is only just beginning: Antarctica, and that which has been called “the seventh continent” (and certainly the most vast): the oceans. In any case, the production of extremely detailed maps (usually based on aerial or satellite imagery) of a region does *not* signify that one knows its fauna, much less *all* its fauna. This brings us to the second classic objection to cryptozoology: there is no longer any hope of discovering significant new species of animals.

The historical study of the discovery of species belonging to diverse branches of the animal kingdom shows, on the contrary, little slackening in the course of the years. Whereas the number of “good” species described per year averaged 4,500 during the 19th century, it rose to about 12,000 during the first half of the 20th century, and has not fallen below 9,000 in the course of the last decades. A thinning out of the possibilities of encountering entirely new fauna through the conquest of unknown lands has been largely compensated for by a systematization of the collection of specimens, and by the multiplication of attempts to establish faunal catalogs as complete as possible. To judge by the rarity of complete catalogs, and the necessity of constantly revising them, we are a long way from finishing this task.

Typically, it would not be surprising today if we discovered an average of 7,000 new varieties of insects every year, hundreds of varieties of each of the large groups of marine invertebrates (molluscs, worms, and crustaceans), and about a hundred varieties of fish. That one can discover much larger animals in the oceans, and even on *terra firma* or in freshwater bodies, seems incredible to many, yet the inventory of marine animals of very large size and terrestrial forms of all kinds is, itself, far from being completed. Every year, an average of three or four amphibians, two or three reptiles, as

many birds, and nearly a dozen mammals are discovered. As to the group wrongly considered the best known, the mammals, we only possess *relatively* complete global identification guides, and full catalogs only for those of Europe, North America, and Australia (and these catalogs contain many doubtful and controversial points). For the guides of Africa, the best-informed authors have deliberately excluded from their manuals all the species of small size, and no mammalogist has yet dared to undertake an equivalent guide for Asia, either for its temperate/cold zone (Palearctic Region) or its tropical one (Oriental Region), and certainly not for South America (Neotropical Region).

The basic objective of cryptozoology, after tentatively locating a species still "hidden," is the gradual accumulation of all the available information on it. One must learn as much as one can about it from its "representatives," so as to be able to put together a kind of identikit picture for it, to sketch the salient features of its behavior, to determine the nature of its habitat, the approximate limits of its area of distribution, and, eventually, to place it, with a reasonable degree of precision, in its proper zoological classification. This would permit one to know with more certainty where and when to look for it, how to approach it, by what ruses to attract it, and, finally, how to bring it down or capture it.

By thus orienting itself toward the discovery of hidden animals, cryptozoology can contribute significantly towards making as complete as possible the inventory of our planet's fauna, and to aid (before it is too late) in the collection of species whose natural habitats are rapidly being destroyed. The example of the recently extinct animals of Madagascar, which disappeared within historical times, shows that a spectacular fauna can disappear, without our even realizing it (and without being directly exterminated by man). A long-range goal of cryptozoology, in my opinion, is to obtain the strict protection of species menaced with extinction before they are even officially recognized. The spread of its methods of investigation is an urgent matter, and a major motive for its reproof of the "wait and see" attitude.

THE SNARES OF MYTHIFICATION

Only one major objection made of cryptozoology demands that we stop and make a carefully considered rebuttal. It is the objection raised by folklorists, which argues that those animals thought to be hidden because they are unobtainable are, in fact, the product of popular imagination. Traditions and even circumstantial reports dealing with animals still unknown are typically full of fantastic details, even supernatural ones, which are basically incredible. The description of these animals and of their behavior seems borrowed, at least in part, from some personage of universal mythology, and from the sagas of heroes or popular tales. In short, utilizing religious, epic, or folkloric themes whose origins are lost in the depths of time.

The refutation of this objection is delicate and subtle, for it requires that we take into consideration an irrational process, and one of the most obscure at that; namely, mythification.

Let us note that a myth (from the Greek *mythos*, meaning word, narrative, story, legend, or fable according to various authors) does not spring from the delirium of a disordered imagination, and is never pure invention. One of those who has best analyzed the question, Mark Schorer (1960), states that the definition of myth "must be both broad and loose, for myth operates universally and diversely." He adds: "Even a loose definition does not include the current journalistic sense of falsehood." It is only according to a degraded usage that "mythic" has become a synonym for "fictional." On the contrary, myth had, at first, the opposite meaning of "veridical narrative," a "true story," and even a "fundamental truth," and this conception has always been the case in those societies called "primitive."

The study of myths has shown that they reflect primordial beliefs, slowly developed or revealed, which deal with the gods, with the birth of the Universe and everything it contains—from stars to people—with life and death, with sacred rites which may go back to the most distant prehistory, and with historical persons and events transformed into archetypes. The infrastructure of myths, apparently solidified and unshakeable, held itself to be essentially sacred, and is found in the epics of heroes as well as in popular fables, fairy tales, or stories which figure humanized animals. In effect, myths support and impregnate all our thoughts, and seem to have their roots in the subsoil of our being, in what C. G. Jung called "the collective unconscious." It is not impossible that they are intimately tied to the structure of the brain and its functioning, which developed in the course of biological evolution.

So, finally, what defines mythological thought?

Such thought appears to be adaptive, comparable to the immunological defense systems of the body, designed to forearm the mind of men against the traumata associated with novel experiences. These experiences are even more terrifying when we never actually confront them: few fears are as great as that of the unknown. In order to neutralize such fears when information of a certain nature received from the external world crosses that portion of the central nervous system which is sometimes called our "emotional brain," it is likely to be quickly shunted into specific mental categories. It is thus stereotyped and deformed by the same rigid mental molds which form the protagonists and intrigues of our mythology, our epics, and even our old wives' tales. It is in this manner that the majestic cycles of the deified forces of nature, the vicissitudes of the lives of heroes, and the fairy tales, show themselves to have a common origin.

Because of this generalized process of mythification, the many episodes of our own individual lives—from the painful experiences of birth to that of death—seem to develop following a scenario written for all eternity. Thus,

we are allowed to feel that they are the most natural things in the world; they are no longer unpredictable and horrifying.

If imagination deserves the sobriquet which Malebranche gave it, the "madman of the house," its madness is thus of the paranoid variety, because it is rigorously systematized. According to the strict, constraining laws of imagination, which presided over the creation and elaboration of language, there is nothing of the fortuitous in the association of phonemes and the diverse objects and actions of our world; they constantly make use of resemblances, correspondences, and parallelisms. It is also these laws which contribute to completing our knowledge and our comprehension of natural phenomena. Some years ago, the philosopher of science Leon Brunschvicg said that "primitives want to explain everything, whereas the civilized are willing to allow gaps." This distinction between the "savage" and the "civilized" has since been recognized as artificial. Whether we like it or not, the unknown terrifies and disturbs everybody. If, in order to control these fears, the "primitive" relies on explanatory myths, which seem naive and extravagant to rational minds, the modern scientist is likely to deal with them through hypotheses no less controversial and thus just as questionable. In both cases, what it comes down to is the elimination of the *lacunae* of knowledge through the use of imagination, which, as we have seen, is strictly disciplined.

Hidden animals, which by definition we know only in a very incomplete manner, lend themselves easily to this kind of "interpolation," to a forced mythification. To compensate one's ignorance, there is an irresistible tendency to assimilate each of them to what Jung called an archetype, the choice depending upon which mythical beast most closely approaches the one experienced. One borrows from the mythical beast its attributes and its exploits—even the most wild—to transfer them to the unknown animal, and the latter's traits are deformed and amplified so that they fit most easily into the mythical mold. Thus, on the eve of its discovery, the gorilla, in reality debonair and reserved, was represented as kidnapping and violating women, like the satyrs of ancient mythology; the whale shark, an inoffensive muncher of plankton, had a reputation which would make the great white shark (antihero of *Jaws*) blush with envy; and the giant squid, denizen of the abyss, is shown grabbing sailors from the bridge of their ship, as did the Scylla of Homeric tradition. The more we became acquainted with these "mythical" beasts, the more the holes in our knowledge of them were filled in, and our perceptions of each gradually began to approach its true nature (although never quite reaching it in popular reputation). There remain shadowy zones and important gaps in our knowledge of all animals, even the most easy to observe. Our familiar animals retain a certain mystery themselves: we still don't know for certain how cats purr. In short, animals are all, without exception, more or less mythified: it is simply a question of degree.

It can thus be seen that, although myth is an important factor, the *existence* of the animal mythified cannot be put in question for that reason alone.

Nonetheless, sometimes the degree of mythification is such that the original species is no longer recognizable, unless one takes the trouble to trace the source of the legend. This is the case, for instance, with the unicorn, which finally acquired an existence *quite distinct* from the animal which "gave birth" to it. The unicorn is the final product of a series of transformations undergone by the Indian Rhinoceros to get it to conform to the myth of aggressive virility. Does this mean that the unicorn, a mythical animal, does not exist? It would be nonsense to so state, because who can decide at what point the animal in the process of mythification ceases to be real?

This said, there is obviously a qualitative difference between the fable of the unicorn, captured by a virgin playing on the monster's traditional weaknesses, and the account of a prosaic encounter with a rhinoceros in the Kaziranga Game Preserve. The difference is not that the former treats a fictional animal and the other a real one. The two stories treat the same animal, but one is a tradition and the other is a personal experience. It is easy to distinguish between the fable and the eyewitness account, thanks to the stereotyped aspect of the former.

No one is likely to mistake the traditional story told by a native for a personal testimony. If one felt uncertain about attributing the description of a hairy hominoid (unknown, and hence partly mythified by its observer) as the simple evocation of some demon, one's doubt could be removed by an analysis of the scenario of the account and its content. The abundance of details taken from legend would indicate that the observation was defective or too hastily made, and that mythifying imagination was allowed to fill in too much (by borrowing, for instance, from the experience of others). In this case, suspicions will be aroused, and the testimony will be taken with considerable reservation.

THE HAZARDS OF MYTH AND OF FASHION

In the analysis of information and data which are indispensable to cryptozoological investigations (as in all scientific research), there are two antagonistic factors of great importance which must be taken into consideration: myth and fashion. That is to say, the eternal and the transient.

One might argue that reported facts are always both mythified and brought "up to date." On the one hand, they are deformed and completed according to the unchanging structures of mythical thought, and, on the other, they are subject to the influence of current scientific conceptions, provisional because of continual reworking, and, as a consequence, arbitrarily selective.

The task of cryptozoology consists not only of demythifying the content of received information, but also of submitting current scientific theories (in

some cases dogmas) of the zoological sciences to the touchstone of systematic doubt. Cryptozoology aspires to a true skepticism, that which opposes both an *a priori* incredulity, and a naive willingness to believe.

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THE STATUS OF WILDMAN RESEARCH IN CHINA

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ABSTRACT: Chinese historical documents contain many references to Wildman, a supposed large unknown primate reported today in numerous provinces. Scientific interest in Wildman in modern China began in the late 1950's, and intensified in the 1970's with fieldwork in northwest Hubei and southern Shanxi provinces sponsored by the Chinese Academy of Sciences. No physical evidence has been uncovered, with the exception of the hands and feet of a supposed Wildman. Morphological analysis indicates that they had belonged to a very large monkey species, possibly a macaque, still unknown to science. These undescribed monkeys may account for sightings of the "smaller" Wildman. A number of reported morphological and ecological characteristics are reviewed, and Wildman's possible affinities to the fossil ape *Gigantopithecus* are discussed. The discovery of an actual specimen of Wildman could shed light on the classificatory status of *Gigantopithecus*, and would certainly enhance knowledge of the origins of human evolution, particularly bipedalism.

EARLIEST HISTORICAL RECORDS AND FOLKLORE

Chinese historical documents, and many city and town annals, contain abundant records of Wildman, which are given various names, such as "manbear," "hairy man," "shangui" (mountain monster), "xingxing" (orang-utan), and "feifei."

In the period of Warring States (475-221 B.C.), Qu Yuan, a great poet, wrote a poem about "shangui" (mountain monster). Some scholars believe that the theme of the poem corresponds to the legend of Wildman.

During the Ming Dynasty (1368-1644 A.D.), the great pharmacologist Li Shizhen mentioned several kinds of Wildman in the 51st volume of his monumental work *Compendium of Materia Medica*. One of them was called "feifei," an account of which is quoted as follows:

"Feifei," which are called "manbear," are also found in the mountainous areas in west Shu [part of Sichuan Province today] and Chu division, where people skin them and eat their palms. The You mountain of Sha county, Fujian province, sees the same ones, standing about one zhang [equal to 3.1 meters] in height and smiling to the people they come across, and are called "shandaren" [men as big as mountains], "wildmen" or "shan-xiao."

Even today, in the area of Fang County, Hubei Province, there are still legends about "maoren" (hairy men) or "wildmen." A local chronicle, about 200 years old, says that "the Fang mountain lying 40 li [2 li equals one kilometer] south to the county town is precipitous and full of holes, where live many maoren, about one zhang high and hair-coated. They often come down to eat human beings and chickens and dogs, and seize those who fight

them." A lantern on which there is an ornament of a "maoren" figure was unearthed in this area during an archeological excavation. It has been dated at 2,000 years.

There are fairly widespread folk tales about Wildman among the peoples of China. One of the most well-known says that there was a kind of long-haired Wildman in the depths of a montane forest. When it saw people, it would smile, grab their two arms tightly, and then faint with laughter. Once recovered, it would kill and eat them. Thereafter, when people entered the mountains, they took a pair of hollow bamboo poles with them. If by chance they met a Wildman, they would put their arms into the poles, and when the Wildman fainted with laughter, they would break away from it by slipping the poles off their arms—and would then either run away or kill it. Stories like this are heard in many parts of China.

EYEWITNESS ACCOUNTS IN MODERN TIMES

In modern times, incidents of people encountering Wildman have been reported from time to time in Sichuan, Yunnan, Hubei, Shanxi, Zhejiang, Fujian, and Anhui provinces, and the autonomous regions of Tibet and Xinjiang. Many witnesses say that they have seen "strange animals," resembling both man and ape, huge-bodied, hairy, and walking upright. (There are also a number of reported instances in which Wildman specimens were killed or captured alive.) Some witnesses, however, say that the Wildman they saw was short and slight in build.

Among these numerous reports, there are two worthy of note because the witnesses were scientific workers and had a good knowledge of natural science. One is Wang Tselin, a biologist, who saw a Wildman killed in the Gansu area in 1940; it was a female with very big breasts, was covered with greyish-brown hair, was about 2 meters in height, and the configuration of its face looked very much like the famous Peking Man. The other is Fan Jingquan, a geologist. With the help of local guides, he watched, at a safe distance, two local Wildman in the mountain forest near Baoji County, Shanxi Province, in the spring of 1950. They were mother and son, the smaller one being 1.6 meters in height. Both looked human. Some Soviet scholars later learned of this, and had it reported briefly in a newspaper.

There have been an increasing number of eyewitness reports of Wildman in recent years, and Chinese scientists are being urged to make on-the-spot investigations.

SCIENTIFIC INVESTIGATIONS IN NEW CHINA

Chinese scientific investigations of Wildman on a regular basis started with the founding of new China, organized by state-owned scientific institutions, funded by the government, and staffed by the scientific departments

concerned. These scientific activities have been as follows, in chronological order:

(1) *Investigation of the "Abominable Snowman" (Yeti) in the 1950's*

By the end of the 1950's, the "Snowman craze" had spread throughout the world, and many private investigation teams from various countries went to the southern foot of the Himalayas to search for it. In China, the investigation was assigned to a Himalayan mountaineering expedition engaged in the mountaineering organized by the All-China Federation of Sports. Participants in this investigation were scientific workers of the Chinese Academy of Sciences and biology professors at Peking University. They conducted this investigation in Tibet, from May to July of 1959, and it was reported that they had found a piece of head hair 16 cm long, and had had it analyzed microscopically. They found that it was different in structure from that of the orang-utan, brown bear, or yak, but could not prove, of course, that it was the head-hair of a Snowman.

Numerous people, including participants in the current investigation, do not believe in the existence of the Snowman. They think that they are probably bears. But Professor Wu Dingliang, an anthropologist and director of the Division of Anthropological Teaching and Research at Shanghai Fudan University, and the present author, both conclude that the Snowman is probably a large, unknown species of primate.

To the knowledge of the author, there are Snowman legends not only in Tibet and Xingjiang, but also in the northwestern areas of Yunnan Province, such as Deoin and Zhong Dian, which are inhabited by people of Tibetan ancestry.

(2) *Investigation of Wildman in the Forests of Xishuang Banna, Yunnan Province, in the 1960's*

In 1961, it was reported that road builders had encountered and killed a female Wildman in the primeval thick forest of the Xishuang Banna area. It was said that the Wildman was 1.2 to 1.3 meters in height, that it was covered with hair, that it walked upright, and that its hands, ears, breasts, and external genitalia were similar to those of a female human. The concerned departments of the Chinese Academy of Sciences conducted an on-the-spot investigation. They failed to obtain any direct evidence, thereby refuting the existence of Wildman in Xishuang Banna. Some participants in the investigation even asserted that the Wildman was nothing but a gibbon living in the thick primeval forests. The present author recently visited a newsman who took part in that investigation. He stated that the animal which had been killed was not a gibbon, but an unknown animal of human shape. It is worth noting that, over the past 2 years or so, some people in



FIG. 1.—Lower parts of the forested Shennongjia Mountain Range, where Wildman has been investigated by Chinese Academy of Sciences expeditions.

the western border areas of Yunnan Province say that the above-mentioned kind of Wildman still move about, and that another one has since been killed. (The author published an article entitled “The Wildman I Saw” in the 10th issue of *New Observer*, 1980, on the Wildman in the forest of Xishuang Banna.)

(3) *Investigation of Wildman in Northwestern Hubei and Southern Shanxi Provinces in the 1970's*

There have been legends about giant-sized “hairy men” existing in the forests of Fang County and the Shennongjia area of Hubei Province since the earliest historical times. Resembling both man and ape, walking upright, and leaving huge footprints, these creatures are said to be covered with red hair, and their head hair is long. In recent years, witnesses have reportedly encountered Wildman on a number of occasions, and this has aroused interest in Chinese scientific circles.

A large-scale scientific investigation sponsored by the Chinese Academy of Sciences was carried out in these areas in 1977. More than 100 people participated in it for nearly a year, and the author took part as head of both the “deep-thrust” team and the scientific research group. As head of the “deep-thrust” team, I directed the investigation of the whole area around



FIG. 2.—The author, in his Beijing office, analyzing Wildman evidence collected in Hubei Province.

the highest peaks of the greater and lesser Shennongjia Mountain Range, which is covered with thick, ancient forests (Fig. 1), and as head of the research group, I was responsible for the summary work based on all the scientific evidence obtained during the investigation (Fig. 2).

Although the investigation was unusual in its scale, number of participants, and duration, no direct proof was found of the existence of the Wildman, and only footprints, pieces of head hair, and feces presumed to be those of Wildman were recovered. (Some of the author's articles on this investigation appeared in a volume entitled *Wolf Children, Snowmen, and Fire Fossils*. More recently, the author wrote a comprehensive summary of the 1977 Shennongjia area investigation entitled “Are We Tracking Down a Non-existent Animal?” This was part of a book, *Mystery Yet to Be Opened*, which was edited by the author.)

After a short break, the investigation of Wildman in the Shennongjia forest areas was resumed. Between 1979 and 1980, an investigation under the sponsorship of local departments included biology professors at Shanghai Teacher's University, and it extended the area of investigation to include neighboring parts of Sichuan province. A skeleton of a “monkey child” was found, which some people believed represented a species of monkey with a

“human” body. Others adhered to the idea that it was the progeny of a Wildman and a human woman captured by the former. But these are tenuous arguments, and in my view the skeleton is that of a deformed human. This view is strengthened by the higher than normal occurrence of human genetic deformities in the area of investigation.

In Shanxi Province, there were reports of villagers encountering a Wildman in the area to the east of the Taibai mountains of Qinling in 1977. It was said to be 2 meters in height, and it walked upright. Subsequently, a biological resources study team from Shanxi Province made an on-the-spot investigation, and suggested that it could be a large unknown primate.

(4) *Investigation of “Manbears” of Jiulong Mountain of Sui Chang, Zhejiang Province, in the Early 1980’s*

“Manbears” in the Jiulong Mountain Natural Reserve Area were recorded long ago in local chronicles. Li Shizen wrote in his *Compendium of Materia Medica* that there were “manbears” in Chu Zhou, which covers the Sui Chang area today, to the southeast of Li Shui County.

Scientific investigation of “manbears” on the Jiulong mountain is mainly under the direction of the Science Committee of Li Shui Prefecture, and participants are personnel in specific fields at scientific research institutions and universities. Preserved hands and feet (two of each) were recently obtained from a middle-school teacher of biology. He obtained them in 1957, when local peasants reportedly killed a “manbear.” These remains represent the first instance of physical evidence obtained during investigations of Wildman in China (Fig. 3).

In December 1980, I went to Sui Chang to study these hand and foot specimens. I concluded, beyond any doubt, that they belong to a higher primate, and have morphological traits of both ape and monkey. The eyewitnesses thought that they had belonged to a Wildman, or of a manlike “strange animal,” but after examining the specimens, I determined that they were not the hands and feet of a Wildman. They might possibly belong to an enormous monkey (perhaps a species of macaque not previously recorded in this area). These hands and feet could not have come from the legendary “manbear,” which is said to be about 2 meters in height, and leaves large footprints. However, there is no denying the possibility that they came from an unknown primate in the Jiulong Mountain area.

There are similar legends about Wildman in places other than the Jiulong Mountain area, such as the Wuyi Mountain in Fujian Province, the Huang Mountain in Anhui Province, and the nearby counties of Sui Chang, Zhejiang Province.

In summary, since the end of the 1950’s, China has organized a series of on-the-spot investigations of Wildman in Tibet, and the provinces of Yunnan, Hubei, Shanxi, and Zhejiang. Among the participants in these inves-



FIG. 3.—The preserved hands from the Jiulong Mountain “manbear” killed in 1957. The author’s analysis indicates that they had belonged to a large unknown monkey species.

tigations have been a number of professional scientists, such as anthropologists, geologists, zoologists, and botanists, as well as personnel in specific fields of zoological parks and natural history museums. Taking part in the investigation in the Shennongjia forest area are experienced huntsmen and skilled scouts.

Up to the present time, apart from the above-mentioned hand and foot samples obtained in the Jiulong Mountain areas of Zhejiang Province, no direct physical evidence has been found to support the existence of Wildman. That is to say, all we know about Wildman is based on indirect evidence, such as folklore, eyewitness accounts, footprints, hair samples, and feces samples. Legends about Wildman in these areas have a long history, however, and there are numerous eyewitnesses. More significantly, the ecological and morphological aspects of Wildman are consistently reported. Thus, it can be inferred that these unknown animals are not mere creatures of fiction. What Chinese scientific workers seek on thickly forested mountains may actually be unknown animals, yet to be scientifically described.

MORPHOLOGICAL AND ECOLOGICAL CHARACTERISTICS

Based on the evidence obtained in recent years, the legendary Wildman of China has the following morphological characteristics:

(1) Its height varies between 1.2 and 2.5 meters. It can perhaps be subdivided into two types, a larger one of about 2 meters in height, and a smaller one, about 1 meter in height.

(2) It can walk upright, but four limbs are used when running fast or climbing slopes.

(3) It resembles both man and ape, with faces, in particular, having mixed features of both.

(4) Its head-hair consists of interspersed short and long hairs, the former 3–4 cm in length, the latter trailing down the shoulders. The hair, reddish-brown, grey, brownish-yellow, black, or occasionally white in color, covers the whole body. Only some of them reportedly have hair of light color on the chest.

(5) Its hands, ears, and male external genitalia are similar to those of humans.

(6) The female has a pair of prominent breasts.

(7) There are two types of footprints. One is large, 30–40 cm, remarkably similar to that of man, with the four small toes held together and the largest one pointing slightly outwards. The other type is smaller, about 20 cm, and more similar to the footprint of an ape or monkey, with the largest toe evidently pointing outwards.

(8) It has no syllabic language, but yells monotonously.

Their ecological characteristics are as follows:

(1) They are usually observed as isolates. Only on rare occasions are they seen in pairs (one male and one female, or one female and an infant).

(2) They can move about in winter, and do not seem to hibernate.

(3) They consume berries, nuts, tender stems, saplings, and roots, but eat insects on occasion. When maize ripens in the autumn, they come out of the forests quite often to take it, and are then likely to encounter people.

(4) They have not been observed using tools, for either food gathering or defense.

(5) They can move about at night, but their eyes do not reflect light, a characteristic that nocturnal animals usually have.

(6) They live mainly in thick primeval forests which are sparsely populated by humans. They are good at avoiding detection by people in groups, but if they encounter a human, they make no aggressive moves.

CONCLUSIONS

Investigative activity and research work on Wildman continue at various levels. It should be emphasized that there are two completely different views on Wildman in Chinese scientific circles. The majority of scientific workers reject the existence of animals in human shape (i.e., Wildman), because of factors related to animal ecology and their modern geographical distributions. They argue that the legendary Wildman merely represents some known animal, such as bear, monkey, or gibbon ape, or that reports of Wildman might be due to hallucinations, or even deliberate fabrications. A smaller number of scholars are of the opinion that the existence of Wildman should not be rejected, and that Wildman might be a living species yet to be identified by science.

Even among the latter, there are different views on the classification of the unknown creatures vis-à-vis systematic zoology. Some think that they are surviving descendants of *Ramapithecus* or *Australopithecus* (especially *A. robustus*), both remote relatives of modern man. Others assume that Wildman belongs to the ape family, and is possibly a living descendant of *Gigantopithecus* or the orang-utan, which thrived in southern China in the Pleistocene.

It is my view that these human-like animals are *not* of human type, or at least that the possibility is very small that they are. Judging from the available evidence, there is no indication that they live in groups, nor that they have simple syllabic language, nor that they make or use tools; and these are the prerogative of the prehumans. It should also be pointed out that no fossil remains which can definitely be associated with *Australopithecus* (especially *A. robustus*) have been found in China.

If the legendary Wildman or the witnessed Wildman exists, I am of the opinion that it is quite possibly the descendant of *Gigantopithecus*. Up to now, only fossil lower jawbones and teeth of *Gigantopithecus* have been unearthed, and it is therefore difficult to infer its height and mode of locomotion. Nevertheless, quite a few scholars estimate their height to be about 2 meters, and some of them even infer that they could walk erect. Since many eyewitnesses report that the Chinese Wildman is about 2 meters in height and walks upright, the fossil evidence could conceivably associate Wildman with *Gigantopithecus*.

It is interesting to note that, in most of the areas where legendary Wildman is reported in modern times, there are still found primeval forests which contain quite a few surviving species of trees of the Tertiary period, such as *Cercidiphyllum japonicum*, *Liriodendron chinensis*, and *Emmenopterys henryi*. In a relatively static environment, which has been less affected by

glaciers of the Quaternary period, it is possible that not only some of the flora but also some of the fauna of previous times could have survived.

Moreover, *Gigantopithecus* was the dominant member of the *Ailuropoda-Stegodon* fauna thriving in the mainland of China in the middle and later period of the Pleistocene. Later, most of the members of this fauna disappeared because of geological changes. However, there are still quite a few survivors; among them, for instance, the Malaysian tapir and orang-utan, as well as the giant panda, which changed its habits and characteristics and remained in the middle and western part of China. Therefore, it is not impossible that *Gigantopithecus*, as the dominant member of this fauna, could also have changed its original habits and characteristics and survived to the present. It may have evolved into the large Wildman now reported in China, the Snowman (Yeti) in areas in the southern part of the Himalayas, and might even have crossed the Isthmus of Bering to become the Sasquatch (Bigfoot) of North America.

However, *Gigantopithecus* is a topic of contention in the field of paleoanthropology. Some scholars maintain that it belongs to the ape lineage, while others believe that it should be included in the human lineage. Consequently, there are different opinions as to its morphological features, and ecological and behavioral characteristics. If we could capture a Wildman and prove that it is the descendant of *Gigantopithecus*, this would, in turn, help classify the fossil *Gigantopithecus*!

What is most astonishing of all, however, is that Wildman is reported to walk upright, and that its footprints are similar to human footprints (it is the same with Sasquatch and the Snowman). How did it evolve a way of walking bipedally? If we could capture a Wildman and understand the mechanics of its bipedalism, this would undoubtedly be of great help in clarifying how the mechanics of human bipedalism evolved. Therefore, if a specimen were obtained, it would not only be an important scientific discovery, but it would also be of great significance to the research on the origin and evolution of all mankind. This is one of the basic premises of Wildman research in China.

My analysis of the hand and foot specimens of the "manbear" of Jiulong Mountain, Zhejiang Province, has produced a new hypothesis. Through many-sided comparative studies of these samples, it is reasonable to postulate that they might not be the hands of an ape at all, but of an enormous species of monkey still unknown to science. Thus, the legendary small-sized Wildman known as "xingxing" in parts of China might have its origin in observations of large monkeys. This hypothesis, of course, requires further study.

Finally, it should be emphasized that many of the participants in Wildman research in China are professional scientific workers. At the same time,

however, it has to be admitted that most of them are not well trained in faunal ecology, primatology, vertebrate paleontology, paleoanthropology, physical anthropology and other disciplines concerned with this topic. Consequently, when they collect and describe evidence, or visit witnesses to obtain first-hand reports, they are not always in a totally objective and scientific frame of mind. This, in turn, can affect the accuracy and reliability of the evidence which they collect. Caution therefore must be exercised when using their materials. However, we are confident that, with the development of further research and experience, these drawbacks gradually will be overcome.

SUMMARIZING A DECADE OF UNDERWATER STUDIES AT LOCH NESS

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ABSTRACT: In consort with other investigators and institutions, members of the Academy of Applied Science (AAS) have engaged in part-time studies of Scotland's Loch Ness during the past decade, with rewarding results in finding and tracking underwater life (including large animate objects and new small creatures), finding geological and man-made structures, developing new instrumentation, and in learning to blend scientists of various disciplines into a cooperative team for underwater exploration and analysis.

SONAR INVESTIGATIONS OF THE LARGE ANIMALS OF LOCH NESS

Since the digital sonar tracking of large underwater targets at Loch Ness in the late 1960's (Braithwaite and Tucker 1968), more extensive sonar exploration has been conducted by the Academy through the 1970's, some in consort with simultaneous attempts at underwater strobe photography. The Tucker equipment, like that of Robert Love of the Loch Ness Investigation Bureau in 1969, involved cathode-ray-tube presentations that made size resolution indication very difficult. The fact that what was detected was many, many times larger than the largest fish echoes, and that it was moving, was, however, incontrovertible. In the late 1970's, R. Parker and J. Buchanon reconfirmed large, moving mid-water targets.

In collaboration with Tim Dinsdale and Robert H. Rines, sonar designer and manufacturer Martin Klein, of Klein Associates, and the Academy brought higher definition chart-imaging side-scan sonar to the loch in the autumn of 1970 (Fig. 1) and, within a very short time, operating in both stationary and towing or moving modes, repeated the findings of Tucker and Love of moving underwater sonar targets of size many times that of the echoes returned from salmon in the loch (Klein, Rines, and Dinsdale 1972).

Since 1972, the Academy has brought to bear a variety of widely different sonar equipments and skilled operators, employing both fixed station and mobile modes of operation, and involving both low and high resolution systems, ranging from 20 kHz to 250 kHz in frequencies. Repeatedly, large moving mid-water objects were tracked, of echoing size ten to thirty or more times that of migrating sea salmon in the loch.

As mentioned earlier, some of the sonar contacts were made simultaneously with strobe photography, as described in the next section, which has provided the security of conclusion that real, sizable objects were in fact in the beam, because of the check afforded by the optical as well as acoustical



FIG. 1.—Robert H. Rines (left) with Martin Klein (center) and Tim Dinsdale deploying a Klein Associates side-scan sonar in Loch Ness.

sensing. Whether the poor quality of pictures is sufficiently definitive to allow an identification is really not germane to the scientific significance of verification of large moving objects; this simultaneous optical-sonar detection rather conclusively strengthens the reliability of the results.

Even more striking, however, is the repeatability in the hands of different researchers, at different times, with widely different sonar equipment, of the same dimensioned and shaped echo characteristics from extremely large moving targets in the loch—all quite distinct from boat, wake, and fish echoes.

Among the more striking repeated experiments are what is believed to be sonar echoing from the side or top of one of these large objects, with remarkable consistency of target width as indicated on the sonar chart recorders (see Table 1).

Not only has there been substantial repeatability of the top or side aspect of moving underwater objects, measured at 2-3 meters in target width (in the direction of the sonar beam), but a unique sonar echo characteristic has been obtained in what is believed to be a *head- or tail-on aspect* of the target—having successive echoing protuberances, numbering 5 to 6, and spaced about 1.5-2 meters apart (as from head structure, front body portion,

TABLE 1.

Year	Team	Type sonar	Sonar operations mode	Target range	Target width characteristics (in direction of sonar beam) indicated on chart	Simultaneous photographic indication of object
1972	AAS, Loch Ness Investigation Bureau, R. & C. Rines, T. Dinsdale, H. Arnold, R. Raynor, T. Willums, R. Needleman, August 9	Modified Raytheon DE725C (200 kHz)	Stationary (proof-positive of moving target)	45 meters	2-3 meters	Yes
1975	AAS, Rines, Dinsdale, June 20	Modified Raytheon DE725C (200 kHz)	Stationary	Approx. 10 meters from bottom sonar and from upper camera	Sonar trigger gate set for approx. 2 meters; triggered	Yes (on upper free-running camera; not on bottom sonar-triggered camera)
1976	Prof. H. E. Edgerton (MIT) and Charles W. Wyckoff (AAS), June 24	EG & G Type 259 (105 kHz)	Stationary	175 meters	2-3 meters	No
	June 25		Stationary	155 meters	2-3 meters	No
	June 25		Stationary	195 meters	2-3 meters	No
	June 28		Stationary	130 meters	3 meters	No
	June 28		Stationary	205 meters	3 meters	No
	June 30		Stationary	145 meters	2+ meters	No
	July 1		Stationary	145 meters	2+ meters	No
	July 4		Stationary	155 meters	3 meters	No
1978	Tom Cummings, Larry Kozak of Klein Associates, with AAS, July 21	Klein Assoc. "Hydroskan" (side-scan) (100 kHz)	Towing	145 meters (in 215 meters of water)	2½-3 meters	No

TABLE 2.

Year	Team	Type sonar	Sonar operating mode	Target range	Target characteristic and width (in direction of beam) indicated on chart	Simultaneous photographic indication of object
1972	AAS, Loch Ness Investigation Bureau, Rines et al., August 9	Modified Raytheon DE725C (200 kHz)	Stationary	35 meters	5-6 parallel strands of average width and spacing 1½-2 meters, for overall width of about 10 meters (plotted over two 5-minute intervals and one 10-minute interval)	Yes
1976	Prof. H. E. Edgerton (MIT) and Charles W. Wyckoff (AAS)	EG & G Type 259 (105 kHz)	Stationary	175 meters	5-6 parallel strands of average width 1½-2 meters, spaced 1½-2 meters, for overall width of about 10 meters (plotted over 10-minute interval)	No



FIG. 2.—One of three subsurface “flipper” photographs obtained in August, 1972, during simultaneous and totally consistent sonar tracking of large unknown target, using an Edgerton elapsed-time strobe camera. Image enhancement was conducted by A. Gillespie, at the Jet Propulsion Laboratory, California Institute of Technology.

appendages, tail structure, etc.) to produce an overall target width of some 10 meters (see Table 2).

Also impressive is the similarity of performance of these targets in the sonar beam. In both the 1972 and the 1976 contacts, the target entered to a position where it stayed substantially in place and then receded at about the same speed of entry, with the departure accompanied by the streaming-away from the target of much smaller fish echoes.

Both in 1972 and 1976, furthermore, the target changed aspect, merging the 5–6 parallel trace signature into the 3-meter wide characteristic, apparently in changing from head- or tail-on aspect to side view.

In the summer of 1980, using an AAS sonar target trigger system (newly designed by D. Marshall of Megapulse, J. Lothrop of Polaroid, and C. Wyck-off of Brite-Lite, Inc.) for monitoring targets of 1.5–2 meters width in the direction of the beam, and automatically triggering a miniaturized 35 mm underwater camera designed for portability, as by dolphins, several triggerings were effected at 10 meters depth, but with inconclusive photographic results. This again verifies the consistent size of moving targets discussed before.

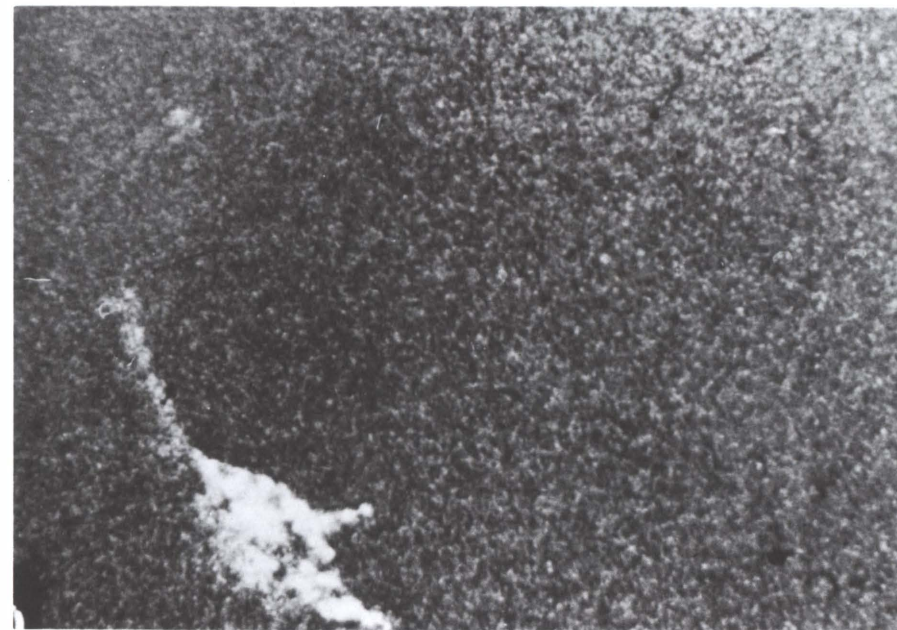


FIG. 3.—Subsurface “full body” photograph obtained in June, 1975. The upper part is interpreted to be a long neck and head extending from a bulky body.

VISUAL OBSERVATIONS AND SURFACE AND SUBSURFACE PHOTOGRAPHY

On at least three occasions during the 1970's, Academy investigators filmed, at a distance, moving protuberances in the lake that were setting up wake patterns in excess of several inches of amplitude—disturbances that did not resemble mergansers, swans, or other known lake birds, otters, seals, or the backs of even very large salmon.

The author and Carol Rines, in the company of the late former Wing Commander Basil Carey and Winifred Carey (and, unknown to them at the time, from a water-level perspective, local farmer Alex McLeod and his son Bill), were treated to the spectacle of about five minutes observation of a somewhat angular hump moving into Urquhart Bay, returning and submerging—a protuberance unanimously identified as an animate back almost 25 feet long (as contemporaneously compared with a nearby moored 52-foot vessel), and about 4–6 feet out of the water at the apex.

These episodes were repetitive of sightings and photographs of a myriad of other observers over the years (Whyte 1956).

Of more excitement to the Academy are the very rare subsurface photographs obtained with the Edgerton elapsed-time strobe cameras, some free-running and some accompanied by simultaneous sonar tracking or triggering as described above (Figs. 2, 3, and 4).

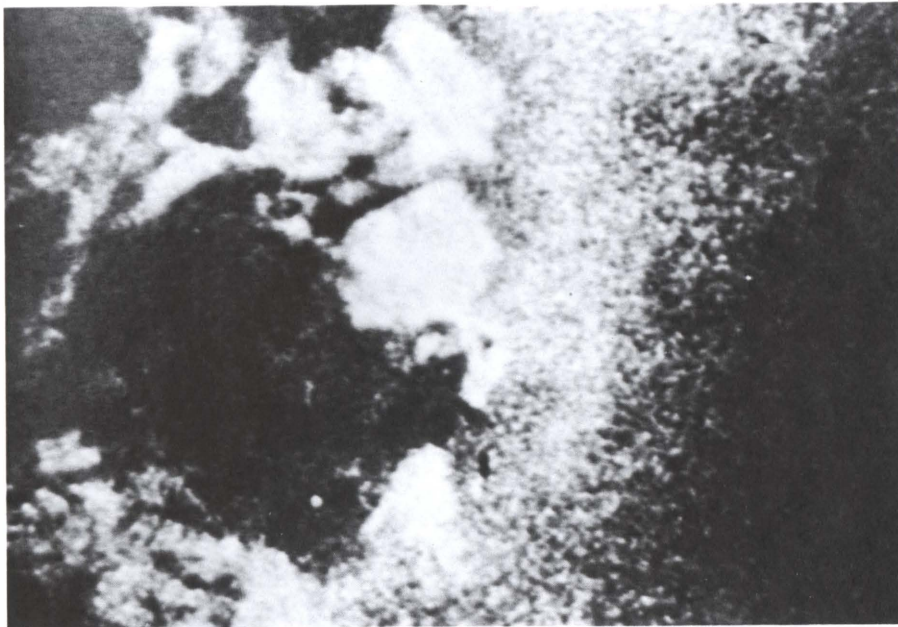


FIG. 4.—Subsurface photograph obtained in June, 1975, of what is interpreted to be the head of a large animal. Had the fast sonar-triggered, elapsed-time strobe technique now being used been in operation in 1975, there would have been several photographs of the "head" taken from different angles. This may have aided in identification.

OTHER STUDIES AND DISCOVERIES

We have reported elsewhere upon the serendipity of our side-scan sonar studies by Klein and Edgerton, leading to the finding of circular ring patterns on the bottom of the loch (Klein and Finkelstein 1976, Rines 1976), the shallower only of which have to date been partially explored by diving teams led by Professor Peter Milne of Glasgow University, Ian Morrison of the University of Edinburgh, Ivor Newby, and John Mills of Underwater Instrumentation Ltd. Some of these bear some resemblance to the surface structure of land burial cairns, and some to poured rock dumpings during the dredging of the Caledonian Canal in the 1820's.

The surprisingly flat bottom across the gorge that bounds Loch Ness has been plotted by different-frequencied bottom penetrating sonar, with some interesting indication of possible filling of an originally more steep cleavage, or of sound diffraction artifact effects (Klein and Finkelstein 1976).

The apparent sterility of the loch bottom away from the river mouths was verified by Academy members in cooperation with the crew of the Vickers submersible Pisces 8, in 1973. Despite the halide searchlights, we could see only 6–8 feet in front into the "tea" stained water (when our bottom runners

did not accidentally touch the bottom, setting up a dense cloud of exploding silt). We practiced using the mechanical arms of the submersible to recover an old rifle dumped into Urquhart Bay by the constabulary, signifying a useful tool if interesting skeletal remains or other artifacts are pin-pointed (despite Professor Morrison's recent experience that the chemistry of this type of Scottish lake is hostile to the preservation of bone). Incidentally, Carol Rines' color movies taken in saline Loch Linne from the Pisces 8 are of excellent quality. Would that Loch Ness were that clear!

Sound-listening experiments conducted in audible ranges by Academy board member I. S. Blonder have not yielded hopeful results. Sound attractant tests by Theo Brown of Australia, who has coordinated with Academy work over several years, assisted by Holly Arnold, have also not yet been successful. But more recent super-audible frequency bursts in the 40 to 85 kHz region have been recorded as received underwater by the Klein group (Rines and Curtis 1979) when tracking one of the large moving objects, and are to be tested as possible attractants in pending research. This may be fortuitous if future use of trained dolphin assistance is called upon in view of similar super-audible frequencies that Academy researchers have found to be emitted and received by dolphins.

Stimulated by the Carol Rines sighting, and photographs of moving "pipe" protuberances, the late Professor George Newton of MIT and the AAS conducted infra-red sensing tests of the loch surface, developing a 1–2 mile sensing capability. In the short time of the tests, he obtained no results bearing on the Loch Ness animal phenomenon.

Still unexplained is the bulbous type of scooting "animal" that we photographed underwater in 1973, but have never seen since.

The exciting discovery of indigenous Loch Ness bottom fish (not observed within depths less than about 75–100 feet), burrowing into the silt upon disturbance, and spending much of their time just hovering upon the bottom using tail and pectoral fins as stilts, introduced a new component to the food-chain supply in the loch. Sir Peter Scott, John Mills and other members of our team finally trapped one of these fish, characterized in the smaller sizes, at least, by red dots at either gill—later identified as a char, albeit Loch Ness species.

The above-mentioned miniaturized sonar-triggered elapsed-time camera equipment (TAD) developed by the Academy is one of our principal hopes for the continued experiments; either used in multiple numbers as buoys (dubbed "monster pots" by our New England members versed in the fishing for lobsters) to ensure more than partial pictures of animals and other objects, or carried by our research-minded dolphins, who have in our preliminary experiments shown their skill and zest for the quest.

The continued support and keen interest of our team and its friends in so many universities and private, governmental, and business institutions, who

contribute their expertise and resources to this intermittent and part-time continuing effort, are deeply appreciated; as is the long-time logistic and research assistance of Academy Counsel Robert Needleman, of our U.K. Coordinator, Gordon Sutherland MacKintosh, and of our Executive Vice-President, Howard S. Curtis.

CONCLUSIONS

Our researches in consort with others at Loch Ness have been rewarding, though frustrating in view of the limited time we have been able to devote to continued effort to date, the hostility of the environment, and of the problem itself.

Until adequate photographic results or higher definition sonar imaging is evolved, identification of the moving objects under the loch will not be possible.

Even were there not the growing wealth of surface and subsurface pictures and observations by reliable persons, the consistency of sonar tracking to date removes all doubt as to the continued presence—as we start the 1980's—of large, moving underwater animals in Loch Ness.

Recent interest at Loch Ness by Adrian Shine, J. Hogan and others in underwater television applications, which we found unrewarding for our purposes in our 1976 expedition with equipment of that vintage (though useful in the identification of the bottom char previously described), is another hopeful sign. Perhaps the animals already photographed so painfully and inadequately may electrify the world by posing on television.

The Academy team considers that the task for the 1980's is to help others who may be able to spend more time and with new techniques, and to put appropriate time and resources of our own into identification of the animals.

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THE *RI*—UNIDENTIFIED AQUATIC ANIMALS OF NEW IRELAND, PAPUA NEW GUINEA

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ABSTRACT: An aquatic creature roughly resembling the traditional "mermaid," and sometimes identified with it, is reportedly known through a variety of encounters with natives of Central New Ireland. The *ri*, as they are called, are frequently sighted by fishermen, occasionally netted or found dead on beaches, and sometimes eaten. Males, females, and juveniles are reported, subsisting on fish in the shallow seas around the Bismarck and Solomon archipelagos. It is unlikely that the animals are dugongs or porpoises, both of which are known to, and readily identified, by the natives.

Anthropologists working in New Guinea can generally expect to record long inventories of rather fanciful "bush" creatures—spirit beings, monsters, and fearsome animals. While the flora and fauna of New Guinea are by no means completely known or recorded, we know enough of its human inhabitants to recognize a tendency toward anthropomorphic projection: human existence is seen as immanent in the world, and changes or discontinuities in the landscape correspond to other "kinds" of people or beings.

Accordingly, I was able to record a fascinating menagerie of "bush beings" during my fieldwork among the Barok speakers of Central New Ireland Province, Papua New Guinea, in 1979-80 (Figs. 1 and 2). "But the *ri* is different," a well-educated school headmaster remarked to me, "it really exists." He was referring to an aquatic creature that is part of the regular experience of men, women, and children in a number of coastal villages in central and southern New Ireland. It is called, with the nominalizing prefix, *a ri* (pronounced "ah ree"), and is described as an air-breathing mammal, with the trunk, genitalia, arms, and head of a human being, and a legless lower trunk terminating in a pair of lateral fins, or flippers. There is a tendency for natives to identify *ri* with the depictions of mermaids they have seen on matchbox covers or fish cans, though legends about *ri* and stories of human encounters with them pre-date the coming of Europeans to New Ireland.

I first became aware of the phenomenon when an older informant, in his sixties, described to me the body of a *ri* that had been cast up on a beach when he was an adolescent. Shortly after talking to him, in November of 1979, I attended a pig feast at Ramat to consecrate a "men's house" which had been destroyed in World War II (Fig. 3). I casually asked one of the men present whether he had ever seen a *ri*. To my astonishment, he replied that one appeared almost every day on the flooded reef of Ramat Bay,



FIG. 1.—Location of New Ireland, a Province of Papua New Guinea. (Circle indicates the area of Fig. 2.)

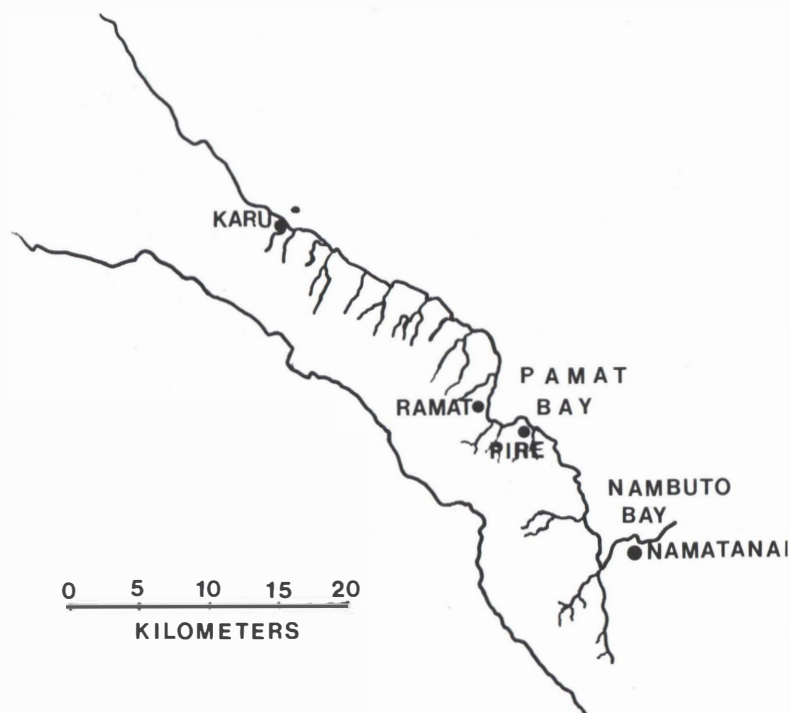


FIG. 2.—Area of *ri* reports and sightings, central New Ireland.



FIG. 3.—The pig feast to consecrate a "men's house" at Ramat.

offshore of his house, and that, when it had finished fishing, it would display its head and hands to those on shore, "to show that it, too, was human." The men, women, and children of his hamlet, he said, had seen it countless times, and he invited me to come out whenever I had the chance.

That evening, I drove over to his hamlet, located at the tip of the small bay (Fig. 4). When I arrived, he said the tide was out and that it was unlikely the *ri* would appear, but we went to look anyway, and I climbed a small tree at the water's edge. After perhaps a half hour, he became very excited and shouted: "There it is, there it is!" Gradually, I could discern, several hundred yards out, something large swimming at the surface in a broad arc toward the shore. We watched as it came closer, and the best view I got was of a long, dark body swimming at the surface horizontally. Suddenly, a sawfish jumped immediately in front of it (the range was close enough that I could identify the facial projection), and the dark object submerged and did not reappear.

Following this experience, I interviewed everyone I could find who had had encounters with *ri*, or claimed to know something about them. Several years earlier, for example, my host had been called to witness an adolescent female *ri* caught accidentally in a net by native fishermen (nets are the only way in which *ri* have apparently been apprehended). He left the *ri* on the beach in the charge of some young boys while he left to call a nearby plan-

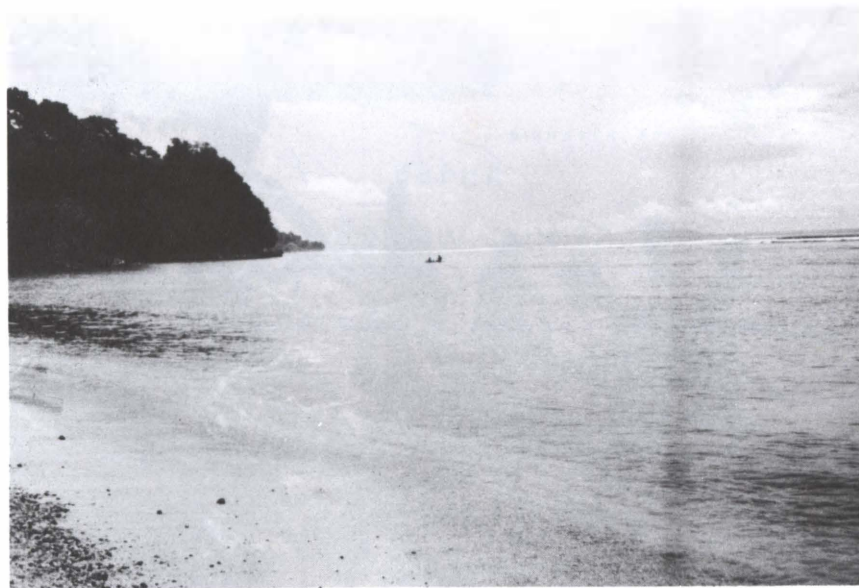


FIG. 4.—Reef at Ramat Bay, where *ri* sightings were made, and other encounters reported.

tation manager, but when he returned, the boys, shamed by the creature's nakedness, had allowed it to creep back to the water and escape.

About a year before my encounter, a village magistrate of my acquaintance had a face-to-face confrontation with a *ri* on a reef during a communal fishing expedition. The creature arose from the water and stared at him from a distance of about twenty feet. An ambivalent and sometimes violent man, the magistrate flung his fishing spear at the *ri*, "but I couldn't make up my mind whether to hit him or not, so I threw it crookedly. You would expect it to be frightened off; but no, it surfaced farther on and just stared at me again." When I asked him what the face of the *ri* looked like, the magistrate, who had formerly worked as a policeman in Rabaul, replied that it resembled "a monkey." The same man claimed he had, on another occasion, witnessed a male and female *ri* copulating in the surf. On another occasion, while discussing *ri* with an informant, a local boy of about ten interrupted our conversation to describe how he had seen a line of *ri*, male, female, and juvenile, swimming up into a freshwater stream by moonlight. Also, during their long December–January vacation, schoolboys often make a sport of diving offshore with glass face-masks in order to catch glimpses of *ri*.

More sobering were accounts of human beings deliberately killing *ri* for food. This is said to be done regularly on the offshore islands of Lihir, and at Siar, at the southern tip of New Ireland. I have interviewed quite a number

of men who claimed to have eaten *ri* flesh, and to have been present at the butchering of *ri*. My informants commented that *ri* have "a great deal of blood, like a human being, and their body fat is yellow." Out of curiosity, I asked whether there were vestigial leg bones in the lower extremity, and was told that its skeletal structure consisted only of an elongation of the spine.

A few years ago, a man from Manus Island was reported to have caught an old female ("there were two, but this one was too weak to get away") while net fishing near Namatanai. They hauled her ashore, and as they threw her into the back of a truck to be taken to Namatanai and butchered, "she uttered an almost human cry" of pain. The meat of *ri* is said to be sold on the open market in towns like Namatanai. There is also at least one account of a *ri* having been fed and kept alive in a native "men's house" for several weeks. At the end of interviews, I would often ask why the *ri* was not shown to, or brought to the attention of, officials or colonial administrators, and was usually met with the reply: "But you people know all about *ri*; you put pictures of them on your matchboxes and canned goods."

Native tradition treats the *ri* along with other kinds of sea life. In one myth, a battle between the two totemic sea birds gave rise to the present-day shapes of various creatures: one hid between bark shields and became the turtle; the porcupine fish got its spines by being struck with many lances; and the *ri* were people who sought to escape the violence by becoming half-fish, "and their mouths, too, became fish-like."

The most widespread story, however, traces their origin to the Nakela clan of the east coast. It seems that once, before European contact, a Nakela troupe was performing a dance at the large, conclusive mourning feast, of *kaba'*. The percussion accompaniment made a serious blunder, bringing irreparable shame upon the clan, and the people considered how to wipe out the humiliation. Finally, they committed mass-suicide by jumping off a high sea-cliff; their bodies turned into rocks, which can still be seen there, and their souls became *ri*.

In the cultural context of the Nakela, it is not beyond the bounds of credibility that a blunder of this nature could be a source of great communal humiliation. The *ri* are *tadak*, or tutelary spirits of Nakela, and whenever one is killed or found dead, the Nakela hold a mortuary feast for it in their "men's house." An administrative official also told me that, in his youth, he had seen a fishing party throw back a *ri* that they had netted, crying "it is human," and fearing the anger of the Nakela if they had harmed it.

Eyewitness descriptions of *ri* vary considerably, though they concur on a number of points. The upper torso of the creatures is supposedly human or human-like, with long, dark head hair in both sexes, and skin that is lighter than that of Melanesians. The females have obvious mammalian breasts, and each sex has human-like genitals on the front of the lower torso. The

fingernails are long and sharp, the palms of the hands are deeply ridged and calloused, and there is something strange about the mouth. *Ri* are not regarded as being sapient creatures, as human beings are, probably because they are not known to speak (one informant claimed that they speak in whistles or whispers), but they are said to have a sense of shame, for they will often try to conceal their genitalia when exposed on the beach. *Ri*, in the native descriptions, are air-breathers who live largely in shallow water and sleep on deserted beaches or sand-bars. They live by catching and eating fish, and are said to be very wary of injury to their relatively thin, human-like skin, for blood quickly attracts sharks.

The information I collected indicates that *ri*, or at least accounts of *ri*, are distributed all around the central and southern shores of New Ireland, and through the stretch of water that separates New Ireland from Buka and Bougainville Islands in the Northern Solomons. An older Barok man of my acquaintance had served as a sailor on the Burns Philip ship *Maivara* in his youth, and he told me that he had once jumped overboard in the sea off Buka Island in an attempt to capture a *ri* that he saw basking on the surface, but it outswam him. I also interviewed a native from Aitape, on the north coast of New Guinea itself, who claimed that *ri* were quite frequently hauled in by fishermen there. This suggests a distribution around the shores of the Bismarck Sea, the Solomon Sea, and the Pacific proper off the shores of the Bismarck and Solomon archipelagoes.

Whatever the *ri* may be, they are certainly not dugongs. While the dugong is comparatively rare on the coasts of Central New Ireland, the Barok know it as *bo narasi* ("pig of the ocean"), and are perfectly capable of identifying it. For a Barok man to identify the corpse of a *ri* washed up on a beach or caught in a net as that of a dugong would be as unlikely as for an American hunter to bring home a deer on his front bumper and try to convince his neighbors it is a bear. Confusion with porpoises is even less likely; I myself became quite familiar with the sight and habits of coastal porpoises while in New Ireland, and I would not be able to confuse one with anything else.

Clearly, the various native accounts of the *ri* contain contradictions and improbabilities. While the *ri* are said to be venerated by the Nakela clan, and even accorded human status, they are reportedly butchered, and their flesh sold in the marketplace at some locations. It is difficult to understand how such disparate perceptions of the *ri* could have come about.

From an anatomical and evolutionary perspective, the physical descriptions of the *ri* also pose problems, but a discussion of these is beyond the scope of this article.

I don't think the credibility of some of my informants can be lightly dismissed, however. That, coupled with the general concurrence on many

features of the *ri*, strongly suggests that some such creature exists, and that it remains unknown to science.

The *ri* were peripheral to my research interests on New Ireland, but given the information I've recorded, a future investigation specifically directed toward ascertaining the existence and nature of the *ri* may be a worthwhile venture.

THE LOCH NESS MONSTER: PUBLIC PERCEPTION AND THE EVIDENCE

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ABSTRACT: Nessie's public image is akin to that of mermaids or unicorns: almost everyone has heard of it, but few believe it is a real animal. This public image is at variance with informed opinion: books and magazine articles have, since the 1950's, predominantly expressed belief in the real existence of Loch Ness animals. This discrepancy, it is suggested, arises in part from the fact that the public image reflects newspaper attitudes, which have not changed since the 1930's.

"The Loch Ness Monster" qualifies as a cliché: "a commonplace phrase, a stereotyped expression" (*Oxford Universal Dictionary*, 3rd ed.). What are the connotations of this cliché? How did that come about? How accurately do those connotations reflect the knowledge gained by those who have studied the Loch Ness phenomenon?

Few people have not heard of the Loch Ness Monster. It is featured in cartoons, in prose and poetry for adults and children (Hoyle 1971, Hughes 1966, Kellogg 1977, MacKenzie 1952), in the catalog of a respectable supplier of scientific wares (Carolina Biological Supply Co.), in television commercials, at Disneyworld (Orlando, Florida), and in Busch Gardens (Williamsburg, Virginia). It is the very prototype of aquatic monsters: a Japanese trawler fished up *not* a South Pacific sea-monster, but a "South Pacific Nessie" (Anonymous 1977).

Even so, few people believe that the Loch Ness Monster actually exists as a species of animal; in fact, only 13% of adult Americans believe in it (Greenwell 1980). To most people, the Loch Ness Monster means a mythical creature, a Scottish tourist-trap, an occasion for jokes and hoaxes, a subject to be talked of in the same breath as ancient astronauts, Atlantis, and the Bermuda Triangle (Cazeau and Scott 1979, Sladek 1973). How well does that public image reflect informed opinion of the evidence that Loch Ness harbors an unidentified species of large animal?

Not at all well, if one judges by the books and articles dealing with the subject. I have located some two dozen books and about 250 articles in magazines (in English). All but one of the books projects some degree of belief in the reality of Nessies (Bauer 1980). Overall, about 45% of the articles project belief, and only 35% express disbelief. But there has been a pronounced change in attitude over the years (Table 1): up to the 1950's, disbelief was preponderant, whereas since then the articles expressing belief have been twice as numerous as the skeptical ones.

TABLE 1.—Distribution of expressed belief in magazine articles.

	Strong or complete belief	Tendency to belief	Neutral	Tendency to disbelief	Strong or utter disbelief	Numbers of items
1933-34	25%	5%	20%	10%	40%	27
1935-50	25%	0%	10%	0%	65%	12
1951-59	40%	10%	15%	5%	30%	22
1960-71	50%	10%	10%	5%	25%	69
1972-80	40%	10%	20%	15%	15%	113
1933-80	40%	5%	20%	10%	25%	243

That the informed writers on a given subject regard evidence as convincing, of course, is not in itself a good reason for believing that evidence. There are innumerable cults whose bulletins and journals express beliefs that are rejected by most of us—about astrology, for example, or a flat earth, or the healings and predictions by Edgar Cayce, or a whole congerie of such mystics, cum psychics, cum charlatans, as Rudolf Steiner or Madame Blavatsky or P. D. Ouspensky or Annie Besant and so on and on.

The writings about Loch Ness do not fit this stereotype, however. With only a handful of exceptions, the books come from very respectable publishers, and the magazine articles have appeared preponderantly in respectable journals (Table 2): about 100 in such general-interest magazines as *Time*, *Harper's*, *Illustrated London News*, *Listener*, and *Reader's Digest*; about 50 in magazines of popular science—*Popular Mechanics*, *Popular Science*, *National Geographic*, and so forth; about 30 in the scientific literature—*Science*, *Nature*, *Herpetological Review*, etc.; and between 30 and 40 in special-interest periodicals, some of which represent the gullible fringe—*Fate*, etc. Altogether, less than 5% of the literature about Loch Ness could be dismissed as coming from clearly untrustworthy sources.

It is also noteworthy that the number of articles in science journals and popular science magazines has increased markedly since about 1960. The

TABLE 2.—Numbers of articles in periodicals of different sorts.

	General-interest magazines	Popular science for laymen	Regular scientific journals	Special-interest (non-scientific) periodicals
1933-34	15	4	5	3
1935-50	8	1	—	—
1951-59	16	2	—	—
1960-71	32	22	5	3
1972-80	29	18	19	29
		(None during 1936-56)	(None during 1935-67)	(None during 1935-66)

TABLE 3.—Type of periodical and projected attitude.

	Strong to slight belief	Neutral	Strong to slight disbelief	Numbers of articles
General-interest magazines	45%	25%	30%	98
Popular science	40%	20%	40%	47
Special-interest (non-scientific)	50%	30%	20%	34
Scientific journals	25%	45%	30%	29

most qualified expert opinion has become willing to consider and to write about Nessies during the last two decades. Belief in Nessies is projected more in the nonscientific periodicals than in the scientific ones, but even in the latter there is as much belief expressed as disbelief (Table 3). In 1980, a survey of American and Canadian aquatic biologists revealed that nearly 40% of those scientists gave credence to the evidence that Nessies are real animals (Greenwell and King 1980).

It is also worth noting that pro-Nessie writings are more factually accurate than are the critical ones (Table 4): one third of the debunking articles contain serious errors of fact, and another 10% have minor errors; of the neutral and pro-Nessie writings, only 5% to 10% have serious errors, and only another 5% to 10% have minor errors.

Altogether, then, the considerable amount of serious writing on the subject over the last 20 years has taken a stance somewhere between openminded and favorable to the existence of Nessies. Yet the public image remains as I described it earlier—skeptical, even sarcastic, preponderantly against giving credence to Nessies as real animals. I now want to show how this dichotomy of attitudes (the public cliché at variance with the soundest knowledge) came about. Not that such a dichotomy is at all unusual. Cliches and stereotypes sometimes have little or no relation to the actual facts. An outstanding recent example is the cliché, “the ugly American,” used in a sense that is dia-

TABLE 4.—Correlation between expressed disbelief and errors of fact.

Expressed attitude	Percentage of articles containing no significant errors	Percentage of articles with			Numbers of articles
		Minor errors	Definite errors	Totally erroneous presentation	
Strong or utter belief	84%	10%	3%	3%	97
Inclined to belief	84%	11%	—	5%	19
Neutral	84%	5%	2%	9%	43
Inclined to disbelief	65%	8%	19%	8%	26
Strong or utter disbelief	57%	10%	17%	16%	58

TABLE 5.

Month	Items in <i>London Times</i>
1933, November and earlier	—
December	29
1934, January	17
February	0
March	1
April	1
May	1
June	1
July	1
August	6
September	3
October	1
November	2
December	2

metrically opposite to the one in which it was originally introduced (Lederer and Burdick 1958).

My thesis is that public opinion has been molded far more by the newspapers than by books or magazines, and that attitudes projected by the newspapers have not changed over the 50 years during which the Loch Ness Monster has been a cliché. It was, in fact, quite reasonable and consonant with the evidence to regard the matter as a hoax and a contrived tourist attraction in 1934.

On the first point, the combined circulations of the important newspapers ensured a more widespread public impact than that made by the monthly

TABLE 6.—Frequencies of writings, 1933–79 (numbers of items in each category).

	Items in <i>London Times</i>	Articles in journals; chapters or sections of books	Books solely or chiefly about Loch Ness
1933–34	65	27	1
1935–39	21	4	0
1940–44	1	3	0
1945–49	0	4	0
1950–54	3	5	0
1955–59	1	20	1
1960–64	11	40	3
1965–69	11	20	3
1970–74	12	27	7
1975–79	27	89	11
Totals	152	239	26

periodicals, let alone the full-length books that came decades later. Likewise, on the analogous subject of UFO's, a survey has found that newspapers exceeded magazines as a source of information by a factor of between 2 and 3 (Strentz 1970).

The *London Times* treated the Loch Ness story as prime news at the end of 1933 and into the New Year: 46 items appeared between December 8 and January 18 (Table 5). But on that day, an editorial stated: "The creature . . . is clearly of a retiring disposition, with an abnormal, a truly monstrous, dislike of publicity . . . 'tis gone—gone rather stale by now, perhaps, and ere very long to be gone west." Since then, the *Times* has not changed its opinion, giving very little coverage to Loch Ness—five mentions from 1940 to 1959, and only a couple a year since then (Table 6), except when there was considerable publicity over underwater photographs in December of 1975. So the *Times* has not responded to the change which occurred among informed people. In part, no doubt, this has been due to the fact that the number of informed people is small and not well or readily known to journalists. Also, newspapers are not good at treating subjects in depth and perspective, points illustrated in detail in the previously mentioned study of press coverage of UFO's (Strentz 1970); one might state that newspapers deal in (and propagate and perpetuate) clichés, rather than examining the origins and justifications of clichés. The inflexibility of editorial attitudes, especially on this type of subject, was vividly illustrated by a Scottish newspaper whose editor wrote, in 1970, that the paper had not mentioned water monsters since the time it had been taken in by a hoax—in 1877 (Campbell and Solomon 1972: 102)! This lack of perspective in coverage is also illustrated in the *London Times*: There is a possible reference to the Loch Ness Monster in a 7th-century biography of St. Columba, and that reference was mentioned in the *Times* on six separate occasions, each time as though it were a novelty to be drawn to the readers' attention (13 December 1933, 2 May 1934, 11 August 1934, 7 July 1960, 12 May 1972, 12 December 1975).

It was indeed reasonable to conclude, in early 1934, that the Loch Ness Monster business was spurious. Expert opinion ascribed the reports of sightings to such stray visitors as a whale, a shark, a large seal, or to such phenomena as mirages and tree-trunks. A couple of reports of the monster venturing onto land, crossing the loch-side road, added high improbability to the whole affair. One of those reports was coupled with the hoaxed discovery of bones on the shore; another hoax fooled an expedition sponsored by the *Daily Mail*: a supposed spoor of the monster had been made using a preserved hippopotamus' foot; and Commander Rupert T. Gould, who made a personal investigation, concluded that a sea-serpent had become trapped in Loch Ness—at a time when science did not recognize the existence of sea-serpents (Dinsdale 1982, Gould 1976, Mackal 1976, Witchell 1976).

So there was ample reason for the public image of the Loch Ness Monster to be what it became in 1934. That public image has not changed, but the evidence *has*. I suspect that a similar situation is likely to prevail in all cryptozoological quests until, in each instance, absolutely incontrovertible evidence is in, and that seems to be defined by biological scientists as actual specimens.

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A NOTE ON FOLKLORE IN HOMINOLOGY

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ABSTRACT: Mythology and reality can be closely interconnected, as in the case of hominology, the study of Sasquatch-like creatures. While folklorists tend to dismiss real hominoids, the existence of mythological hominoids is a necessary, though not sufficient, condition of the existence of real hominoids. The factual origin for some hominoid myths should be given consideration.

The relationship between "realists" and "folklorists" in hominology (the study of unknown living hominoids/hominids) has not been easy or productive, and this has induced me to re-examine its background and to try to lay down some basic rules.

There are philosophers who insist that "reality" exists only in the mind of the beholder. I know of no logical argument to counter this assumption, which can be regarded as an extreme case of "folklorism." Presumably, such a philosopher would be consoled by the thought that a drama is only taking place in his head.

On the other hand, we know that an archaeologist, Heinrich Schliemann, who, proceeding from the ornate imagery of the ancient Greeks, confronted the world with the reality of Troy. Schliemann was a realist, and there can be little doubt that if he and other archaeologists had asked and followed the advice of "folklorists" on the reality of Troy, the precious relics would still be lying underground.

This example shows that there can be totally different entities bearing the same name, and our failure to recognize and differentiate such entities leads to a lot of confusion and useless arguments. The name Troy applies, on the one hand, to a figment of an ancient poet's imagination, studied by specialists in literature and mythology, and, on the other hand, to a real historical city, whose study is the business of archaeologists and historians.

Of course, the two entities are interconnected in some way; one was the cause of the other, and for both there can be some overlapping characteristics, but, on the whole, their natures are so different that it would be most unwise to judge the one, say the historical city of Troy, by our knowledge of the other, the mythological Troy.

I believe the same argument applies in hominology, the term we apply in the Soviet Union to the study of Sasquatch-like creatures. There are *real* hominoids (that is, creatures of biology—we know this from several categories of evidence combined), and there are *imaginary* ones (those of mythology). Our opponents say that one kind is quite enough (those of mythology), which dispenses with the necessity for real ones. The existence of

mythological hominoids is a necessary, though not sufficient, condition of the existence of real hominoids. The argument was set forth by us in 1976 as follows:

Folklore and mythology in general are an important source of information for science. But hominologists look for myths about these creatures not only to find a real basis for the myths and to supplement their knowledge of the problem. They also need the myths as such, for they are yet another "litmus test" confirming the historical reality of hominoids. If, in the course of history, people had encounters with "troglodytes," then these most impressive beings could not have escaped the attention of the creators of myths and legends. Of course, the reality of relic hominoids cannot be supported by recourse to folklore alone, but neither can it be refuted by such references, as our opponents have attempted to do. Is the abundant folklore, say, about the wolf or the bear not a consequence of the existence of these animals and man's knowledge of them? Therefore, we say that, if relic hominoids were *not* reflected in folklore and mythology, then their reality could be called into question. Fortunately, this channel of information is so wide and deep that much work can be done in this sphere: it is necessary to re-examine and re-think a good many anthropomorphic images playing important roles in folklore and demonology [Bayanov and Bourtsev 1976].

The last conclusion of the quote seems to find support in the words of Wayne Suttles:

If there is a real animal, shouldn't there be better descriptions in the ethnographic literature? Not necessarily. Anthropologists do not consciously suppress information, but they sometimes do not know what to do with it. There are ethnographies of peoples whom I know to have traditions of Sasquatch-like beings that make no mention of such traditions; I suspect that these omissions occur not because the writers had never heard of the traditions but because they did not know how to categorize them [Suttles 1972].

I wish ethnographers in the U.S.S.R. would make such a scientifically fruitful admission. Why is it difficult for ethnographers to categorize such material? Probably because they have no idea what is real and what is imaginary in it. And the fact that the informants do not know either cannot be of much help to the scientist, who should always attempt to draw a line between fact and fiction.

Hence, ideally, "realists" and "folklorists" in hominology should sit down together and, without violating each other's territory, sort out the mountain of folklore on hominoids. When Suttles says that "a large non-human primate would not really steal women" (Suttles 1972), I am afraid he trespasses on the turf of other kinds of experts. When a nineteenth-century Russian ethnographer said that the large breasts of a female wood-goblin ("forest woman") had been made-up by ignorant peasants to symbolize heavy precipitation, he simply ascribed his own ignorance and fantasy to his informants. What about the image of a "tree-striker" that has the habit of "knocking down dead trees" (Suttles 1972)? Well, if it's a hominoid's way of feeding on larvae, the image has a basis in reality.

In the abstract of a paper (Suttles 1980) presented at the 1978 Manlike

Monsters Conference at the University of British Columbia, Suttles asked: "If the Sasquatch is a real animal, why should there be several Indian images, some rather different from the usual non-Indian image?" I think it is the folklorist who is to ponder this question. To ask it of the realist would be like asking Schliemann to account for every flight of Homer's fancy.

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MOKELE-MBEMBE: PROXIMATE ANALYSIS OF ITS SUPPOSED FOOD SOURCE

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ABSTRACT: Speculation continues about Mokele-Mbembe, a supposed genus of sauropod reported over the last 200 years to have survived in the Central African swamp-forests. A 1981 scientific expedition into the Likoula swamps of the People's Republic of Congo failed to make sightings, but did return with "molombo" fruit, reputed to be a staple food of the animal. Proximate chemical analysis of the fruit, and nutritional comparison with large mammals, suggest that a diet more diverse than only molombo fruit would be required by the animal.

INTRODUCTION

Reports of large, semi-aquatic herbivores of a kind not known to zoology have come out of the Central African swamp-forests for about 200 years (Heuvelmans 1978, Ley 1948, Mackal 1980). Some observers have speculated that the animals in question, known in the Congo Republic as Mokele-Mbembe (but reported in neighboring countries under other African names), may represent a surviving sauropod genus. Others have proposed that, if the animals exist at all, they may be unclassified reptiles or mammals, but with a less spectacular heritage.

There are two consistent features of Mokele-Mbembe reports which are of some interest to the nutritional scientist. One is morphology, which involves a bulky, elephant-like body, a long, slender neck, and a small head. Learning about the physiological affinities of such an animal would be of some significance to zoology, as would be knowledge of its protein/calorie consumption.

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FIG. 1.—“Molombo,” a fruit from a Central African liana of the genus *Landolphia*, said to be a food source for Mokele-Mbembe.

The other consistent feature in the reports is that the animal is an herbivore. Although Mokele-Mbembe is said to be dangerous, attacking dugouts and killing the occupants, its diet is supposedly strictly vegetarian. (There is no inconsistency in this; hippos, which are vegetarian, have also been known to attack the occupants of dugouts.) Its main food staple, according to the African inhabitants of the area, is derived from “molombo,” the Lingala name for a liana belonging to the genus *Landolphia*, which has white flowers, apple-sized fruit, and a sweet, white latex sap (Fig. 1).

A scientific expedition headed by Roy P. Mackal of the University of Chicago penetrated the Likouala swamps, in the northern part of the People's Republic of Congo, in late 1981. Fruit specimens of one of the many *Landolphia* species were secured by expedition members, and a small quantity of these were submitted to the authors for nutritional evaluation. Of particular interest was whether *Landolphia* fruit could, in fact, meet the nutritional requirements of large, mobile herbivores in closed-canopy, tropical swamp-forest. The purpose of this paper is to consider the nutritional implications of the data obtained by proximate analysis.

METHOD

The fruit had been transported in a sealed plastic container, with formaldehyde as a preservative. They were round, firm, and all about 35 mm in diameter. They were combined to make one composite sample. Several weeks had elapsed from the time of collection, so no significance could be assigned to “as-is” moisture content. The sample was pulverized in a Waring blender, dried for 18 hours in a vacuum oven at 60°C, and ground to –30 mesh in a laboratory model Wiley mill. Analytical data are reported as the means of triplicate determinations.

Proximate analyses were obtained by the following established methods: crude lipid content using 2:1 (v/v) chloroform/methanol by Soxhlet extraction; crude protein content by the microKjeldahl method; and ash content by firing in an electric muffle furnace at 600°C. Acid detergent fiber and acid detergent lignin were determined by the method of Van Soest (1963), and gross energy was obtained by calorimetry using a Parr oxygen bomb.

RESULTS

Proximate composition of the molombo fruit collected is shown in Table 1, with data for hyacinth, alfalfa, and pear included for comparison.

DISCUSSION

A theoretical discussion of a wild animal not fully defined as to size, eating habits, and classification as mammal or sauropod is difficult at best. Based upon a single food item collected, it is impossible to determine if the animal is omnivorous or herbivorous. The chemical characteristics of the molombo fruit are such that most animals could consume it, because it is relatively low in fiber (8.5%) and protein (7.9%), and has a high carbohydrate content (72.2%) (Table 1).

This food item, if representative of typical food consumed, could be used by either a ruminant or non-ruminant animal, because the fiber content is low enough to allow a non-ruminant animal to utilize it. However, the protein content is very low for a non-ruminant animal, and on the lower

TABLE 1.—Proximate composition of molombo fruit (*Landolphia* sp.).^a

	Crude lipid, %	Crude protein, %	Ash, %	AD fiber, %	AD lignin, %	Carbohydrate, ^b %	Gross energy, kcal/kg
Molombo	4.1	7.9	5.8	8.5	1.5	72.2	4,211
Hyacinth ^c	1.6	16.4	7.5	37.2	—	37.3	4,200 ^d
Alfalfa ^c	2.1	20.2	8.0	29.4	—	40.3	4,270
Pear ^c	2.1	6.1	4.0	23.8	—	63.9	3,900

^a Data reported on a dry weight basis.

^b Values determined by difference.

^c National Academy of Sciences (1972).

^d Calculated gross energy.

extreme for a ruminant animal. The high carbohydrate content of the "fruit" would furnish the bulk of the calories whether the animal were ruminant or non-ruminant. The chemical composition of molombo does not aid in distinguishing whether Mokele-Mbembe is a ruminant or non-ruminant animal. If the animal in question is a surviving sauropod, we can only speculate about its dietary habits.

Estimation of the caloric intake per day of the animal can be approached by making certain assumptions. An elephant weighing 3,672 kg consumes 49,000 kcal per day, which could be provided by 12.3 kg of alfalfa. (Alfalfa has approximately 4,270 kcal/kg as listed in Table 1.) A large unknown mammal of similar size could be expected to require approximately the same number of calories. Kleiber (1975) gives an equation for resting animals as follows:

$$\text{Resting Energy Metabolism} = 70 \times (W_{\text{kg}}^{0.75})$$

where W = weight.

It is uncertain whether this equation would apply to a sauropod. The protein intake requirement can be calculated from the following equation (Kleiber 1975):

$$\text{Minimum Protein} = 2 \times 70 \times \frac{(W_{\text{kg}}^{0.75})}{1,000} \times 6.25$$

The low concentration of protein in the fruit (7.9%) would not meet the requirement of a monogastric animal, and would be marginal for an adult ruminant. These calculations suggest that the animal would need to utilize more than molombo fruit as a nutritive source.

The comparison of molombo fruit with other known food sources listed in Table 1 emphasizes other differences. It is unusual to find an ingredient of animal diets that is as low in both fiber and protein as is molombo fruit. In this respect, it resembles the pear more closely than either the hyacinth or alfalfa, although the fiber level in pear is three times as high. Whether molombo fruit contains anti-nutritional factors and is actually palatable to animals remains to be answered. It is hoped that future expeditions will provide further information about Mokele-Mbembe and its dietary preferences.

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AN ESTIMATE OF THE DIMENSIONS OF THE LAKE CHAMPLAIN MONSTER FROM THE LENGTH OF ADJACENT WIND WAVES IN THE MANSI PHOTOGRAPH

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ABSTRACT: Empirical results relating the appearance of the sea surface to wind speed and thence to the length of wind waves are used to provide an estimate of the dimensions of "Champ," as seen in the Mansi photograph. Over the possible ranges of wind speed and fetch, lower and upper bounds for the water-line dimension of "Champ" range from 4.8 m to 17.2 m.

INTRODUCTION

A problem which commonly arises in the interpretation of images of unfamiliar objects on water is that of determining their size. In the absence of nearby reference features, the eye cannot estimate absolute dimensions reliably. Too often, even when photographs are available, neither the geometry of the situation nor the optical properties of the camera are known with sufficient accuracy to deduce scales from triangulation. An example in point is the color Instamatic photograph of the Lake Champlain Monster ("Champ") taken by Sandra Mansi in 1977, appearing here as Fig. 1. A sketch based on the photograph appears as Fig. 2. Color reproductions of the original photograph have been published in *Time* (July 13, 1981) and in *Life* (August, 1982); black and white versions have appeared in *The New York Times* (June 30, 1981) and in *The ISC Newsletter* (Vol. 1, No. 2). Neither the features of the far shore, nor the shrubs appearing in the foreground, are suitable as a scale for the object seen in the water.

This paper discusses the use of a different scale, which may sometimes be used in scenes of the water surface. It is shown here how, from the general appearance of the water surface, it may be possible to estimate the length of waves seen thereon, and hence to use the latter as a scale with which to compare objects of uncertain dimensions. The method is applied to the Mansi photograph.

METHOD

Mariners estimate wind speed from the appearance of the sea surface through the Beaufort scale (Table 1). Each level in that scale is associated with visually distinguishable features of the sea surface. The first step in this method thus consists of deciding on a Beaufort Scale number corresponding to the conditions observed. This step yields a range of possible wind speeds.

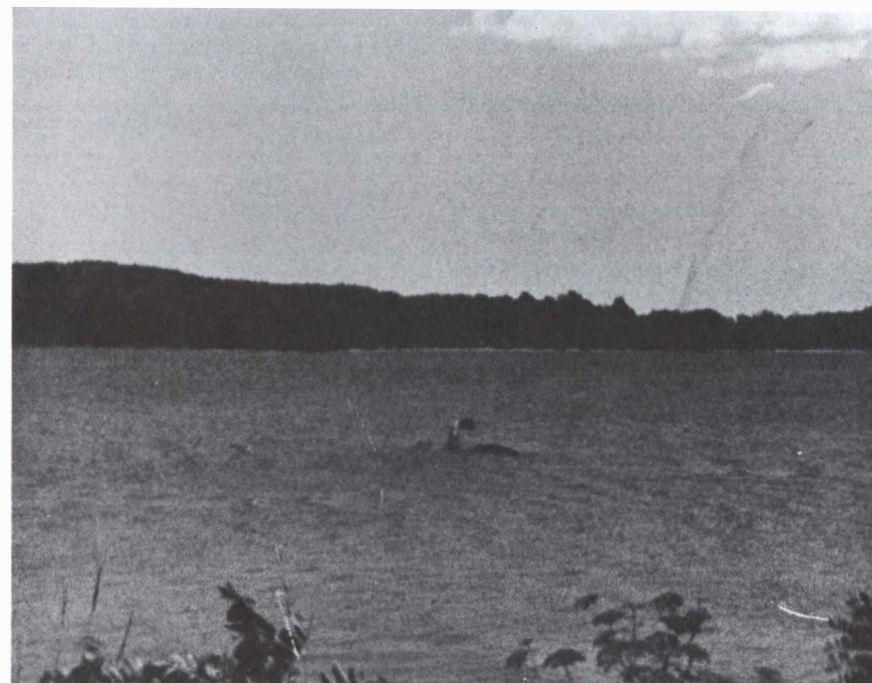


FIG. 1.—Photograph of the Lake Champlain Monster taken by Sandra Mansi in 1977 with an Instamatic camera (original in color).

The properties of wind waves depend on the speed and duration of the wind, and on the fetch over which it has been blowing. Waves may be fetch-limited or duration-limited, depending on which of these two factors impose a limit on their size. Empirical results relating the significant wave period T_s and wave height H_s to fetch F and wind speed U are given in a number of sources (Wiegel 1964, U.S. Army 1973, Van Dorn 1974). A graphical form of these relations is shown in Fig. 3. Knowing fetch and wind speed, one must first estimate the wind duration t_{\min} below which the waves are duration-limited. If the wind has blown for a time $t > t_{\min}$, the period T_s and the wave height H_s are read from the appropriate curves as functions of the parameter gF/U^2 . Should t be less than t_{\min} , however, a shorter fetch F^* is used, related to F through $F^* = Ft/t_{\min}$; wave height and period are then calculated from gF^*/U^2 .

The wavelength λ depends in general on the water depth D , as well as on wave period T_s . Provided the water is not too shallow, however, i.e., not less than about one third of a wavelength, the depth dependence is unim-

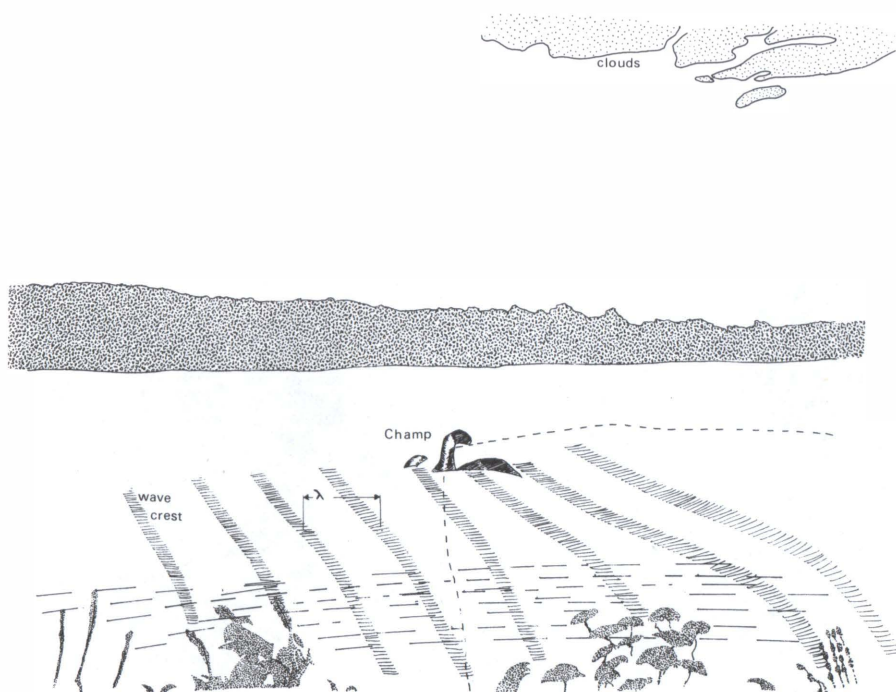


FIG. 2.—A sketch of the Mansi photograph of Champ emphasizing the waves visible at the water surface. See text for explanation of symbols.

portant, and one may use the approximate expression (LeBlond and Mysak 1978):

$$\lambda = gT_s^2/2\pi.$$

The final step in the procedure consists of comparing the horizontal extent of the unknown object at the water line with the length of the waves in its immediate vicinity.

Sources of error may appear at many stages of the estimation method, and this must be kept in mind when interpreting the results. First of all, the Beaufort scale determines only a *range* of wind speeds. Secondly, there is some possibility of error in the fetch estimate if the wind direction is not known with certainty, or if the exact position of the observation is not precisely determined. The duration of the wind may not be available, with possible consequences on the effective value of fetch which enters the calculations. Finally, wind waves are quite variable in their length and height, and although the significant wave height and period correspond closely to visually observed wave properties, they are average estimates: individual

TABLE 1.—The Beaufort wind scale and the appearance of the sea at various wind speeds. The scale has been truncated here to the lower wind speeds; continuation to storms and hurricanes may be found in Gross (1977).

Beaufort number	Wind speed (m/sec)	Wind description	Appearance of the water surface
0	0	Calm	Surface like a mirror
1	0.3–1.5	Light air	Ripples with the appearance of scales; no foam crests
2	1.6–3.3	Light breeze	Small wavelets; crests of glassy appearance, no breaking
3	3.4–5.4	Gentle breeze	Large wavelets; crests begin to break; scattered whitecaps
4	5.5–7.9	Moderate breeze	Small waves, becoming longer; numerous whitecaps
5	8.0–10.7	Fresh breeze	Moderate waves, taking longer form; many whitecaps; some spray
6	10.8–13.8	Strong breeze	Large waves begin to form; whitecaps everywhere; more spray
7	13.9–17.1	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks
8	17.2–20.7	Gale	Moderately high waves of greater length; edges of crests begin to break into spindrift; foam is blown in well-marked streaks
9	20.8–24.4	Strong gale	High waves; dense streaks of foam; spray may affect visibility

waves will vary about these averages, and this variability should be taken into account when comparing the dimensions of the object with that of the waves.

RESULTS

The main features of the Mansi photograph are reproduced in sketch form in Fig. 2. The sketch was drawn from an enlargement of the original print, and emphasizes the principal water waves seen in the field of view. Two main groups of waves are discernible. The dominant waves, in terms of height and length, have crests running nearly perpendicular to shore. The appearance of the wave crests and the position of the few breakers indicate that the waves propagate from left to right. The other group of waves, smaller in height and shorter in length, have crests nearly parallel to shore; they appear to result from the scattering of the wind waves from an irregular shoreline. There is no clear indication of waves produced by Champ itself.

The lower right hand quadrant of the photograph appears lighter than the

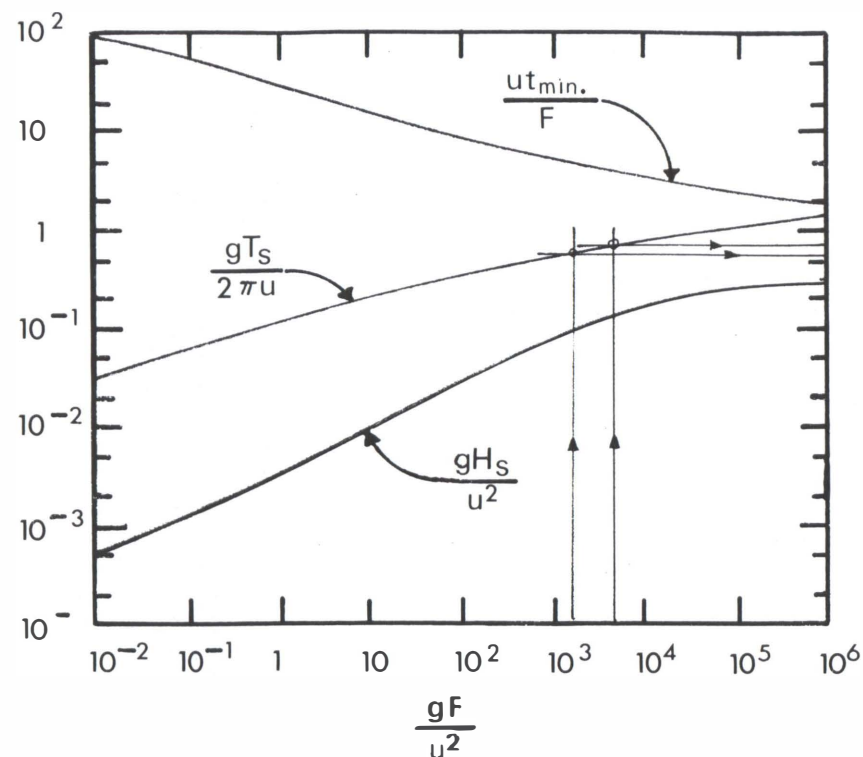


FIG. 3.—Empirical relations between wave properties, wind speed U and fetch F . H_s and T_s are the significant wave height and period respectively; t_{min} is the wind duration below which the waves are duration- rather than fetch-limited. The method of evaluation of T_s from gF/U^2 for the range of F considered in the text and the higher wind speed estimate is sketched in. For greater accuracy, the equation

$$\frac{gT_s}{2\pi U} = 1.2 \tanh[0.077(gF/U^2)^{0.25}]$$

may be used instead of the curve. From Sarpkaya and Isaacson (1981).

rest of the lake surface; this area is roughly bounded by the dashed line in Fig. 2. Although it might be argued that this feature reveals the presence of a relatively shallow sandy area in that part of the lake, this hypothesis is inconsistent with the behavior of the waves travelling over that area. In the other parts of the photograph, waves are seen to be breaking at a few isolated spots and the surface shows the characteristics associated with Beaufort Number 3 (Table 1). As waves travel into shallower water, they slow down, steepen, and eventually break. If the paler area corresponded to the presence of a shallow sand bank, one would expect the waves to be modified, and

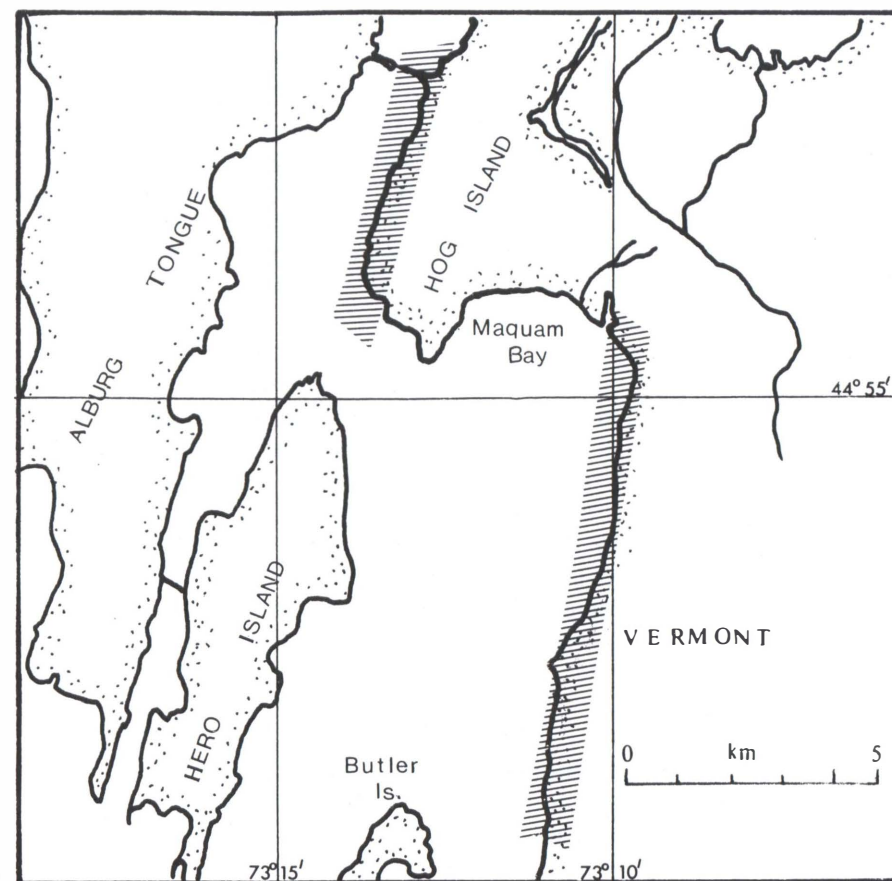


FIG. 4.—The northeast corner of Lake Champlain, from just north of St. Albans Bay, Vermont (below the right hand corner of the map) to the Canadian border, drawn from NOAA map 14781. Stretches of shoreline from which the Mansi photograph may have been taken are shown by a shaded strip.

particularly to break more often there than elsewhere. This is not the case, and it seems more reasonable to attribute the different appearance of that part of the lake surface to reflection of light from the overhead clouds.

The exact location from which the Mansi photograph was taken has not been precisely determined. Interviews with Mr. and Mrs. Mansi (R. Greenwell and R. Mackal, priv. comm., Sept., 1982) reveal that the picture looks generally westwards, from the eastern shore of the northeast part of Lake Champlain, north of St. Albans Bay, Vermont, but south of the Canadian border (Fig. 4), and that the Mansis had to walk about 100 meters across a field to gain access to the lake from the road on which they were driving.

Roads follow the shoreline on the Vermont side from opposite Butler Is. to Maquam Bay, and along part of the west side of Hog Island. Possible fetches from the southern quadrant thus range from about 5 to 15 km.

Given that possible range of fetches, the parameter gF/U^2 takes values ranging from 4,200 to 21,200 for the lower wind speed estimate (3.4 m/sec), and from 1,700 to 5,000 for the higher wind speed (5.4 m/sec) of Beaufort wind scale 3. From the upper curve of Fig. 3, we find that the range of value of t_{\min} , the wind duration below which the waves are duration-limited, is from 1.0 to 3.0 hours for both the lower and the higher wind speed. This duration is short enough that we can assume, in the absence of any other information, that the waves are fetch- and not duration-limited. There is thus no need to correct the fetch, as discussed above, and using the middle curve in Fig. 3, we obtain the periods T_s and (from the equation quoted earlier), the wavelength λ of the fetch-limited waves. For the lower wind speed ($U = 3.4$ m/sec), λ ranges from 3.2 m to 5.5 m; for the higher wind speed ($U = 5.4$ m/sec), λ takes values from 5.4 m to 8.6 m, as the fetch increases from 5 to 15 km. Over the whole gamut of expected wind speeds and fetches, the wavelength can range from 3.2 to 8.6 m. From Fig. 2, Champ stretches from 1.5 to 2 wavelengths at the water line: this dimension thus ranges from an extreme lower bound of 4.8 m to an extreme upper bound of 17.2 m.

DISCUSSION

The range of water line dimensions obtained for Champ is quite broad because the conditions under which the photograph were taken are not known very accurately. If the fetch were known accurately, the ratio of upper to lower bound in wavelength could be reduced by a factor of two. There always remains, however, a range of uncertainty associated with estimating the wind speed through the Beaufort scale, as well as some uncertainty (due to the natural variability of the waves) in determining the scale of the object in term of number of wavelengths.

The inescapable conclusion, nevertheless, is that the object seen in the Mansi photograph is of considerable size. The visual estimate given by Mr. Mansi (15 to 20 feet: 4.6 to 6.1 meters at the waterline) falls within the lower part of the length range estimated here, and provides independent confirmation of this conclusion.

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THE SEARCH FOR EVIDENCE OF MOKELE-MBEMBE IN THE PEOPLE'S REPUBLIC OF THE CONGO

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INTRODUCTION

Between late October and early December, 1981, we conducted an expedition to explore an area in the 60,000-square-mile Likouala swamps of the People's Republic of the Congo. The purpose of the expedition was twofold: first, to investigate the possible existence of large, unknown animals which the natives call Mokele-Mbembe, and believed by some to morphologically resemble Mesozoic sauropods; second, to learn more about the general ecological conditions existing in the area, particularly the vegetation and fauna. Non-probative evidence of Mokele-Mbembe was found. Soils, plants, animals, and archaeological artifacts were collected.

Reports of large, unknown animals in Central Africa can be found in historical literature dating back over 200 years. The first report appeared in a 1776 book by Abbe Lievain Bonaventure Proyard (*Histoire de Loango, Kakongo, et Autres Royaumes D'Afrique, Rédigée d'après les Mémoires des Préfets Apostoliques de la Mission Française*), which stated:

The Missionaries, while passing through a forest, observed the track of an animal which they did not see but which must have been monstrous: The marks of the claws were noted on the ground, and these formed a print about thirty-six inches in circumference.

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In the late 19th century, Alfred Aloysius Smith (Trader Horn) encountered numerous reports of such large, unknown animals in the swamps of Gabon. The natives referred to them as the Jago-Nini. Smith himself had previously found large, unidentified, three-clawed footprints of an animal the natives called Amali, and he associated these tracks with the Jago-Nini. Carl Hagenbeck, a well-known German animal collector, revealed in 1912 that he had received two independent reports of similar animals in the swamps of Rhodesia, one from one of his own employees, the other from a British big-game hunter.

The following year, Captain Freiherr von Stein zu Lausnitz led a German expedition down the Sangha River in the Likouala district of what is now the People's Republic of the Congo. (At the time, the area formed part of the German colony of the Cameroons, which Captain von Stein had been commissioned to explore.) His expedition, cut short by World War I, encountered similar native reports of an animal named Mokele-Mbembe (see Willy Ley, *The Lungfish, the Dodo, and the Unicorn: An Excursion into Romantic Zoology*, Viking Press, New York, 1948). His report remained unpublished for several decades. In it, he stated:

The animal is said to be of a brownish-gray color, with a smooth skin, the size approximately that of an elephant, at least that of a hippopotamus. It is said to have a long and very flexible neck and only one tooth . . . a few spoke of a long muscular tail like that of an alligator [sic]. Canoes coming near it are said to be doomed; the animal is said to attack vessels at once and to kill the crews, but without eating the bodies . . . It is said to climb the shore even in daytime in search of food; its diet is . . . entirely vegetable. The preferred plant was shown to me. It is a kind of liana, with large white blossoms, a milky sap, and applelike fruits. At the Ssambo River I was shown a path said to have been made by this animal in order to get at its food. The path was fresh and there were plants of the described type nearby.

Twenty-four years later, in 1938, Leo von Boxberger, a former German colonial magistrate, explored the Cameroons and encountered similar reports about a "water beast" at the confluence of the Mbam and Sangha rivers, and at the Ntem River. As often happens in these areas, all his notes were lost when his party was attacked by the Pangwe tribesmen of Spanish Guinea.

In 1976, James Powell, an American studying crocodiles at the Ogooue and N'gounie rivers in Gabon, obtained descriptions of a strange animal named N'yamala, similar, he thought, to Trader Horn's Amali. Following consultations with Bernard Heuvelmans in France and Roy P. Mackal in the U.S., Powell returned in 1979 and obtained more first-hand reports. Following an ecological and ethnographic study of Central Africa, Mackal concluded that, if such animals existed, they would probably be concentrated to the east of Gabon, in the unexplored swamps between the Sangha and Ubangi rivers of the northern Congo Republic (Fig. 1). Thus, a new expedition was mounted by Mackal and Powell in early 1980, which took them

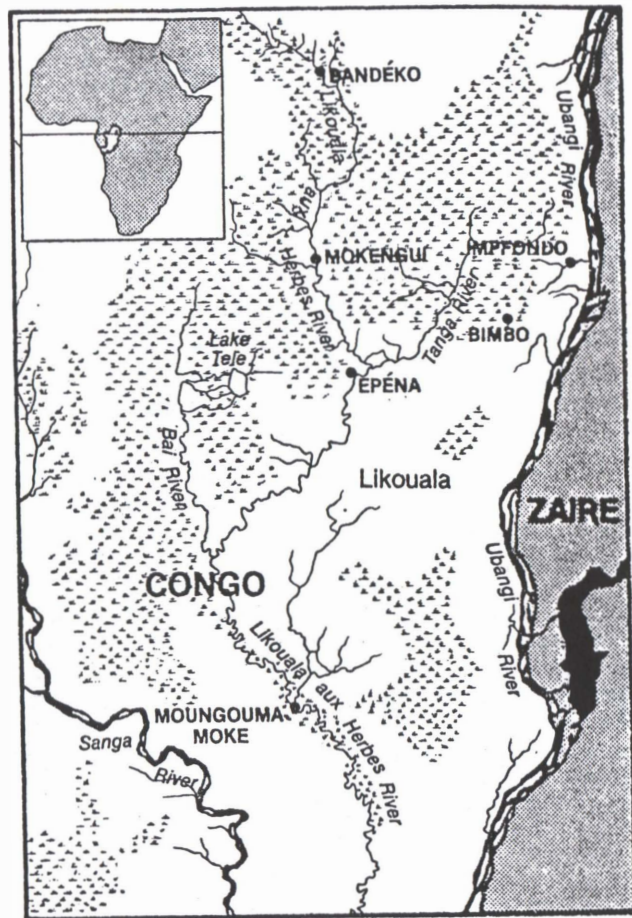


FIG. 1.—The swamps between the Ubangi and Sangha rivers in the Likouala region of the People's Republic of the Congo. The area is just north of the Equator.

to Impfondo, a jungle town on the Ubangi River (which separates the Congo from the Old Belgian Congo, now known as Zaire) just north of the Equator. This area is characterized by thick rain forest and swamp forest, extremely low population density (< 1 person per km^2), and a difficulty in penetration or navigation due to the total lack of roads or other forms of transportation. As predicted, Mackal and Powell found that Mokele-Mbembe was, in fact, reported by the Likouala natives. The party reached Epena, on the Likouala River, before returning to the United States.

Mackal planned a more comprehensive expedition in 1981 to reach the Bai River and, if possible, Lake Telle, where reports indicated a possible

killing and butchering of one of the animals in the late 1950's. No reports were known of non-Africans navigating the Bai River north to what was then thought to be the Tebeke River (so named by the pygmies of Minganga).

The result was the 1981 expedition discussed in this report.

NARRATIVE DESCRIPTION

The expedition members from the U.S. were Roy P. Mackal, J. Richard Greenwell, M. Justin Wilkinson, and Marie T. Womack. Eugene Thomas, American Baptist missionary at Impfondo, served as guide and French and Lingala interpreter.

Initial work was conducted in Brazzaville with numerous agencies and ministries. Following much discussion and planning, appropriate security, photographic, and collecting permits were obtained. An agreement was drawn up with the Director General, Ministry of Water and Forests, and a Congolese biologist was assigned to the expedition, as were two armed security personnel and a Congolese Army radio operator. Technical and logistical support was provided by the Institute of Geography, the National University, the United Nations Office, the French Office for Overseas Scientific and Technical Research (ORSTOM), and the U.S. Embassy.

The expedition departed by air to the jungle town of Impfondo, 500 miles north of Brazzaville, located on the Ubangi River (a major tributary of the Congo), which serves as a border with Zaire. Impfondo is on the edge of the Likouala swamps (Fig. 1).

Three pygmy helpers were hired in Impfondo, and the expedition departed in two dugouts up the Ubangi, through the Djemba Canal, down the Tanga River, to the junction with the Likouala River, and to the town of Epena, where the last government outpost is located. Navigation through the "canal" was difficult due to overgrown vegetation and submerged tree trunks. Following two days at Epena, the expedition proceeded further down the Likouala to the villages of Djeke and Edzama. At the confluence of the Likouala-Bai rivers, it proved almost impossible to locate the route up the unexplored Bai due to extensive distribution of "floating prairie," making motorized navigation impossible and paddling difficult (Fig. 2). One and a half days of strenuous efforts brought the expedition to the village of Kinami, where a base camp was established (Fig. 3).

Forest and savanna forays were made from Kinami, numerous biological collections were made, and sonar work was conducted up the Bai River, beyond the village of Mounkouma Bai. Visits were made to various locations where some villagers claimed Mokele-Mbembe could be found, particularly in "deep holes" in the river. While these areas were, in fact, very deep (30 to 50 feet, as compared to an average river depth of 20 feet), no unidentified animals were observed or tracked on sonar. Fish, fish schools, and crocodiles



FIG. 2.—Expedition members attempting to locate the route up the unexplored Bai River at the confluence of the Likouala and Bai rivers.

were easily located by sonar. Conflicting versions of knowledge of Mokele-Mbembe were obtained at Mougouma Bai. The village chief indicated little knowledge of the subject, and exhibited a reluctance to discuss it. Congolese members of the expedition, however, were informed by villagers that such knowledge was known to them, but that they would not divulge it (i.e., exact areas where Mokele-Mbembe might be readily seen) to white outsiders, particularly Americans.

The planned continuation up the Bai to the Tebeke River and across to Lake Telle was canceled. The northern Bai was not the river the Kabonga Pygmies at Minganga refer to as the Tebeke, as had been thought. The Tebeke, in which the pygmies claim Mokele-Mbembe is found, is further to the west, and could not be reached without a long overland march from the Bai, impossible with large dugouts. Such a venture would require a new expedition coming down from Minganga to the north. The swamps between the Bai and Lake Telle, about 10 miles, were, according to the villagers at Kinami, totally impassable. The only way to reach the lake is by foot, on a hazardous and exhausting four-day march through swamp-forest, from the village of Boa on the Likouala. With gasoline getting low, time running out, and general exhaustion, the expedition leader (Mackal) decided to abandon further efforts to reach Lake Telle.



FIG. 3.—Expedition members setting up a base camp for biological collections. From left to right: Mackal (sitting), Wilkinson, Thomas, and Greenwell.

Of particular interest during the expedition was the observation of faunal species along the route that was taken. Fish, reptiles, amphibians, birds, and mammals were observed. Fish were represented in great quantity in the river systems, and appeared to serve as a substantial protein source for the human population. No attempts at identification or classification were made. Reptiles were best represented by snakes, which are usually immediately killed by the local population when encountered. Because of high reproduction rates, however, there is little danger of species depletion. Many snakes were observed, even close to human habitation. Lizards were plentiful, and some crocodiles were tracked by underwater sonar. Amphibians were not observed in large quantities, probably because of their elusive nature.

Many birds were observed, but they were represented by only a few families. Kingfishers, herons, geese, hawks, and eagles were plentiful. Eagles were perhaps less common, and might possibly be declining in numbers due to human predation. It was noted that, in general, bird species were less plentiful in the Congo Basin than in the Amazon Basin of South America, but that is probably due to already-understood ecological causes.

Mammals, for which eastern and southern Africa have become famous, were not observed in great quantities. The principal species observed were monkeys, which the population harvests for food in substantial quantities.



FIG. 4.—Expedition members attempting to navigate the 20-mile Djemba "canal" between the Tanga and Ubangi rivers.

It appeared that monkey colonies in the environs of villages have been totally decimated, and that longer and longer forays into the forest to reach such monkey colonies are necessary. The depletion of monkey species worldwide has been of growing concern to many governments, and the depletions of the Congo appear to represent the early stages of eventual primate species depletions. Fortunately, the vastness and isolation of the Likouala region still offers considerable sanctuary for both monkeys and apes.

It is of interest that primatologists and primate textbooks do not acknowledge the western lowland gorilla (*Gorilla gorilla gorilla*) as being found in the area. In the Congo, it is believed to be restricted to the area west of the Sangha River. We found, however, that it is well distributed throughout the Likouala all the way to Zaire, and perhaps even further east, although no primatologist has ever entered the Likouala, at least in the past 30 years. Many gorilla reports were obtained from natives, as well as physical evidence. Chimpanzees (*Pan troglodytes troglodytes*) are also well distributed throughout the Likouala.

The expedition's return to Impfondo followed the same route: south on the Bai to the Likouala, and northeast to Edzama, Djeke, Epena, up the Tanga River, and back through the canal to the Ubangi River and Impfondo. Return passage through the canal, during which many species of

snakes were observed, proved to be extremely difficult. The water level had dropped about 1 ½ feet since our entry into the swamps due to the termination of the rainy season, resulting in a continuous series of underwater "jams" on large, submerged tree trunks. A continuous 18 hours of punting by all expedition members (Fig. 4), combined with 6 hours of nighttime, in-water exertion by one expedition member, ultimately resulted in a successful passage of the 20-mile waterway.

Infections among village populations along the route followed were widespread. Drug treatments were often conducted in the mornings. Various infections were acquired by expedition members, which were brought under control. The conditions under which the expedition members worked could be categorized as strenuous. Day-by-day operations were physically and psychologically taxing.

Various biological collections were made (plants, insects, reptiles, birds, and mammals), which have been deposited with ORSTOM, the U.S. National Museum of Natural History, and the University of Arizona.

An archaeological site was also uncovered at Impfondo, and excavation produced more than 30 artifacts (pottery sherds). These were donated to the National University in Brazzaville. Various experiments in cognitive mapping were also conducted with pygmy subjects.

RESULTS

Attempts to gain further information on Mokele-Mbembe were made through standard psychological and ethnographic techniques with villagers, surveillance, inspection of ground or vegetation disturbances, use of sonar equipment, and an informal evaluation of nutritional resources available for large herbivores. Various anecdotal reports were obtained from villagers. Surveillance produced one interesting result. Inspection of ground or vegetation disturbances produced additional results. Sonar tracks failed to produce supportive evidence. An informal nutritional evaluation indicates that the local resources are sufficient to support unknown populations of large, mobile herbivores.

Surveillance

After completing a curve in the Likouala River (north of Epena), a large wake (approximately 5 inches high) was observed originating from the east bank; under the circumstances, such a wake could only be caused by the sudden submersion of a large animate object. Crocodiles do not leave such wakes, and elephants and other large mammals cannot submerge, with the exception of the hippopotamus. Our understanding was (and is) that hippos do not exist in the Likouala swamps, and villagers on the Likouala never see them (they are found in the Ubangi, on the edge of the Likouala swamps).

The wake is therefore cataloged as having been made by a large, unknown animal.

Disturbances

An elephant hunter at Djeke took us to a trail he had found many months before, which he believed could not have been made by an elephant. The trail left a small lagoon, traversed 100 meters of forest, and crossed about 1 kilometer of marsh to the Likouala River (Fig. 5). No subsequent "exit" trail from the river (typical of elephants) was found, indicating the animal remained in the river (not typical of elephants). In the immediate vicinity of the lagoon, large indentations were observed, and broken branches were visible, to a considerable height. Some lay on the ground. These were old and rotting, not recently snapped by the hunter for our benefit. It should be noted, however, that the trail across the marsh and into the river was not observed by us; the tall grass had presumably straightened up again in the ensuing months. The trail is cataloged as having been made by a large, unknown animal.

Nutritional and Ecological Considerations

Mokele-Mbembe is said to be a vegetarian. A large amount of vegetation is available in the swamps, and appears to be adequate to support large mobile herbivores. Samples of "molombo" (*Landolphia*), a fruit which the animal supposedly eats, were brought back and are currently being analyzed. The expedition was never able to penetrate the deep swamp away from the rivers for more than a few miles due to the logistical problems involved. There are vast areas, many thousands of square miles, where no humans (not even the natives) live or penetrate, and it is conceivable that unknown populations could remain there, almost undetected, indefinitely.

If the animals are sauropods, their existence would require ecological explanations for persistence since the Mesozoic. The geological characteristics involved are representative of an area which has undergone little change in the form of mountain building or other distinctive geological features. Vegetation communities have also probably remained relatively constant as a result. What has changed since the late Cretaceous is the generalized distribution of vegetation in Africa. Some have attempted to reconstruct these distributions (see D. I. Axelrod and P. M. Raven, Late Cretaceous and Tertiary Vegetation History in Africa, in M. J. A. Werger [ed.], *Biogeography and Ecology of Southern Africa*, Part I, pp. 17-130, Dr. W. Junk, The Hague, 1978). Lowland rain forest was in a relatively more northerly latitude in the late Cretaceous, but it has remained generally unchanged, although reduced, in Central Africa since then. It appears, therefore, that there are no serious ecological factors that would entirely rule out a Cenozoic persistence of some animals in Central Africa.



FIG. 5.—Small lagoon near the village of Djeke, from which a large animal trail crossed a marsh to the Likouala River.

One line of evidence often cited by paleontologists is the termination of dinosaur fossil records at the Cretaceous-Tertiary boundary. However, such evidence originates from other areas. All dinosaur fossil sites in Africa, for example, are located in north, east, and south Africa. No dinosaur fossil sites exist in central Africa, probably because paleontologists have avoided working in an area where there are few institutions to work through, transportation and communications are very poor, and field recovery conditions in swamps are extremely difficult. One could therefore reasonably argue that the dinosaur fossil record from other areas is not applicable to central Africa, and that one can only discuss Cretaceous dinosaur extinctions in central Africa once a fossil record has been established there.

The Likouala Region represents one of the last, almost untouched, natural biopreserves in existence. With an area of about 60,000 square miles, and a swamp-forest making most forms of transportation impossible, it serves as a refuge for many known species of animals, and probably a number of undescribed species as well.

Nevertheless, depletion of large animals is occurring. Forest elephant (*Loxodonta africana cyclotis*) is being increasingly hunted in the Likouala. Unless the Congolese government ensures some kind of protective program for the elephant (either through enforcement or incentives, or both) the present rate of elephant killing will continue, and it could conceivably cease

to be a Congolese animal within the foreseeable future. The world trade in ivory is the principal cause of the killing. As the biological turnover of elephants is unfortunately very low, the immediate economic benefit of ivory harvesting overwhelms the long-term benefits to the Congo of maintaining normally reproducing elephant communities. Absolutely no elephant conservation or protective measures were observed in the Congo, either on the part of the government or international bodies or societies.

Gorillas and chimpanzees appear to be plentiful in the Likouala, but they are killed whenever encountered. Apes also have a very low reproductive rate due to prolonged gestation and maturation, and the human danger to these species is a threat which cannot be ignored.

As to other unknown animals surviving in the Likouala, there is still only anecdotal evidence. Our expedition found no compelling evidence that Mokele-Mbembe exists, but we think that the historical and anecdotal evidence that does exist is sufficient to warrant further investigation.

FUTURE PLANS

Expedition members have discussed possible future penetrations of the Likouala swamps, particularly as reports of other large animals were also obtained, the descriptions of which cannot be reconciled with known animals of contemporary zoology.

Several target areas have been identified. One would be Lake Telle (the operating area of another recent U.S. expedition), and the swamps immediately surrounding the lake. Another would be the Tebeke River, northwest of Lake Telle, but requiring a totally different route (north on the Likouala, and an overland march to Minganga). Another would be much further south: an on-foot exploration of the swamps between the Likouala and the Ubangi. However, no definite plans have yet been formulated for another expedition.

Any future expeditions should be carefully planned, and should be conducted within the framework of scientific collecting enterprises, in order to further our understanding of the Likouala region as a whole.

LCPI WORK AT LAKE CHAMPLAIN: 1982

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INTRODUCTION

Members of the Lake Champlain Investigation (LCPI) once again worked at Lake Champlain during 1982 in an attempt to identify its presumed colony of large unknown animals. The lake is the supposed habitat of 15- to 30-foot-long unidentified animals whose descriptions closely resemble those of the Loch Ness animals. These mysterious animals of Lake Champlain are popularly referred to as "Champ," "Champy," the Lake Champlain Monster, and the Lake Champlain Sea Serpent, and have been reported since the lake was discovered by Samuel de Champlain in 1609.

More evidence was gathered in 1982 by the LCPI, thus providing more pieces towards the completion of this zoological jigsaw puzzle. However, the conclusive puzzle fragments still await cryptzoological collection, analysis, and assemblage.

Lake Champlain is located on the border between the U.S. states of Vermont and New York and its northern tip enters the Canadian province of Quebec. It is "the largest of the deep, cold water, and near-oligotrophic lakes in the United States with the exception of the Great Lakes" (see Glenn E. Myer and Gerhard K. Greundling, *Limnology of Lake Champlain*, Burlington, Vermont, 1979). The lake is 109 miles long, 11 miles at its maximum width, has a maximum depth of 400 feet, has 440 square miles of surface water area, and has 587 miles of shoreline (see Lake Champlain Basin Study, *Lake Champlain Atlas: Water Quality and Shoreland Use*, Boston, Mass., 1978).

During 1982, 31 days of fieldwork were completed by members of the LCPI at Lake Champlain. Added to this 30-day total was a week and a half of sonar surveying by the Rochester Engineering Laboratories of Fairport, New York. The Rochester Engineering Laboratories are associated with the LCPI.

The principal LCPI researchers and field participants during the 1982 year were Joseph W. Zarzynski and M. Pat Meaney. Zarzynski (director of the LCPI) has researched the problem since 1974. Meaney, an LCPI associate, has participated in LCPI field operations since 1981. The three other associate members of the LCPI, Scott Hill, Jack Sullivan and Jim Kennard (president of the Rochester Engineering Laboratories), periodically participated in LCPI fieldwork during 1982.

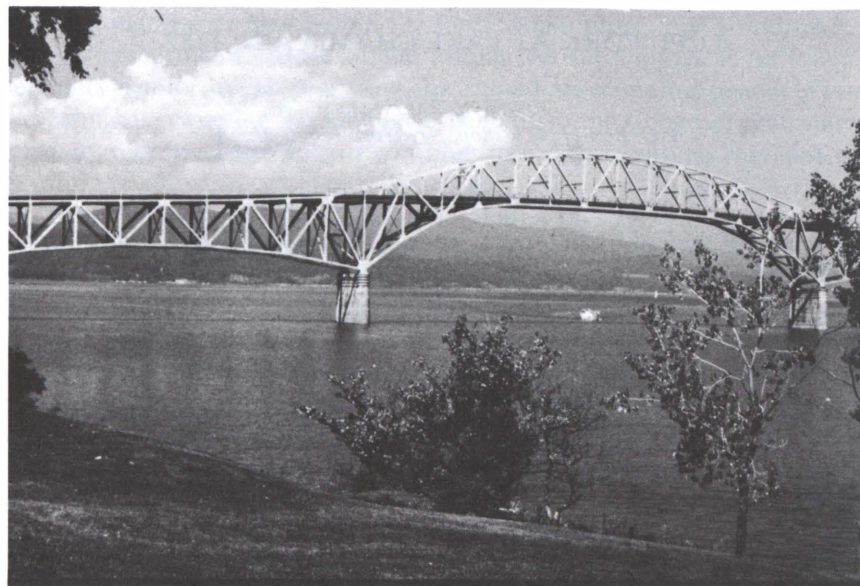


FIG. 1.—Crown Point Bridge, near the southern end of Lake Champlain, where there is a monument to its discoverer, Samuel de Champlain, who first reported the “monster.”

NARRATIVE DESCRIPTION

The 31 days of LCPI field operations consisted of camera monitoring from shoreline and vessel, sonar searches, and related scuba dives into Lake Champlain.

Lake surface surveillance was conducted at such places as: Kimball Dock Pier, Vermont; Potash Bay, Vermont; Split Rock Point, New York; near Crown Point Bridge, New York/Vermont (Fig. 1); Button Bay, Vermont; and along other shoreside sites. Camera watches involved the use of still and motion picture photography with long-range lenses. Camera watching sessions were conducted during daylight from both shoreline vantage sites and from vessels. The 31 days of lake surveillance, sonar work, and scuba monitoring sessions were: April 28, May 13, May 25, May 30, June 4–5, June 11–13, June 26–July 3, July 16–18, July 24–31, September 2, and September 11–12. During some of this time, sonar and scuba operations were conducted.

The sonar and scuba monitoring complemented LCPI lake surface surveillance. Moreover, extensive interview sessions of eyewitnesses and related research were undertaken throughout 1982 as part of an ongoing investigation by the LCPI.



FIG. 2.—Joseph Zarzynski (left) and Pat Meaney about to conduct diving operations off Button Island, on the Vermont side of the lake.

In 1979, Jim Kennard donated the use of his Rochester Engineering Laboratories side-scan sonar (100 kHz). In 1980, Kennard and Zarzynski introduced another sonar unit, a modified Raytheon DE725C, which was affixed to a 4½-foot tripod (200 kHz) and placed on the lake's bottom for sonar data collection. The tripod was designed and constructed by the Rochester Engineering Laboratories. (Similar side-scan sonar and modified Raytheon units have been employed by the Academy of Applied Science during its work at Loch Ness, Scotland.)

Scuba diving forays have also played an important role in LCPI field operations. Sonar targets tracked by the towed side-scan sonar unit were often investigated by scuba teams. Also, a two-diver scuba team was used to deploy the modified Raytheon unit affixed onto its aluminum tripod, and placed on the lake's bottom to monitor for large, unknown moving targets.

Sixteen dives were made in 1982 into Lake Champlain by Zarzynski and/or Meaney, often with support personnel (Fig. 2). Of these dives, seven were specifically for reconnaissance and for laying/retrieving of the Raytheon sonar tripod. The other nine dives were primarily related to underwater archaeological projects, with secondary searches for cryptozoological evidence. Members of the Rochester Engineering Laboratories also conducted several diving sessions into the lake. LCPI associate Jack Sullivan also participated in four Lake Champlain scuba dives with Zarzynski.

The LCPI's field strategy consisted of both daylight surface surveillance utilizing cameras/binoculars, and an underwater search featuring sonar and scuba expeditions.

RESULTS

While several intriguing surface objects were noted during our surface surveillance, only one can be labeled as a "possible" Champ sighting. This "possible" Champ sighting occurred on July 16, 1982. The unidentified surface object was seen in the late afternoon just south of Thompson's Point, in Vermont waters, at an estimated range of three-quarters to 1 mile from observers Meaney and Zarzynski. However, the July 16th "sighting" must be categorized as inconclusive due to the range and the lack of noticeable features on the object.

LCPI sonar expeditions did not track any target within either the sidescan sonar or the Raytheon units' fields that might have indicated a possible Champ animal.

However, on May 1, 1982, a Champ surface sighting by a Vermont citizen, from his houseboat, did produce an interesting sonar anomaly from his own depth sounder/fish-finder sonar unit. This occurred just after the unknown animal submerged, with the houseboat then passing over the area. This sonar anomaly is currently being investigated by the LCPI and other technicians in order to ascertain if it might be Champ-related.

The LCPI was also successful in obtaining a number of new Champ sighting reports. As of this writing, seven 1982 Champ reports have been collected. To date, a total of 168 Champ sightings have been cataloged. A brief summary of these seven 1982 sightings is outlined below:

- May 1, 1982: Raymond W. Sargent, from his houseboat, near Treadwell Bay; head and neck seen at a range of about 150 yards.
- May 8, 1982: Several eyewitnesses at a roadside point saw a grayish-black, 20-foot-long object off Port Henry, New York.
- May 30, 1982: While motoring in their yacht, two Vermonters saw a dark-brown creature estimated to be 30–50 feet long with a 1–2-foot-high head and neck; range was about 40–50 feet from their boat, near Four Brothers Islands.
- July 19, 1982: Claude Van Kleeck and several other eyewitnesses saw a 45- to 50-foot-long blackish-gray animal with an eel-like head off Port Henry, New York; range was about 100–150 yards.
- August 1, 1982: Two police officers from Rouses Point, New York, saw a 20-foot-long animate object off Rouses Point; the animal's head was visible.
- August 5, 1982: Three people saw a "big black animal, like a huge snake with three humps" in Kings Bay, Rouses Point, New York; the animate

object was seen to ram a moored sailboat as it was leaving the bay for the deeper waters of Lake Champlain; range was about 100 yards.

- Autumn, 1982: Mrs. Cathy Cooper saw "three distinct humps out of the water . . . no head or tail" off Rouses Point, New York; seen by two other Rouses Point eyewitnesses later that same day near the same place as Mrs. Cooper's sighting.

FUTURE PLANS

The LCPI intends to continue field operations at Lake Champlain using similar methods as used in 1982. However, future LCPI expeditions may use second generation night-vision gear to maximize lake surface surveillance observations. Besides fieldwork, the LCPI will continue historical research on Champ, will continue to interview Champ eyewitnesses, will strive to further educate the public and the scientific community about the Champ animals, and will work towards identifying and protecting this supposed colony of unknown animals in Lake Champlain.

INVESTIGATIONS AT LOCH NESS AND SEVEN OTHER FRESHWATER SCOTTISH LAKES

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INTRODUCTION

In August, 1982, M. Pat Meaney and Joseph W. Zarzynski conducted camera surveillance operations at several Scottish Highland lochs. The time spent in the United Kingdom amounted to two weeks (August 6-19, 1982), with most of this period devoted to cryptozoological research and field operations.

The purpose of this two-week foray was: (1) to conduct surface surveillance using binoculars and high-powered still and movie camera gear at Loch Ness and seven other freshwater bodies where sightings similar to those at Loch Ness have been reported; (2) to complete a logistical survey for a tentative, more sophisticated return expedition to one of the lochs; and (3) to continue to cultivate the lines of communication with American and U.K. cryptozoologists working in Scotland.

Because our time was limited, we decided to focus our approach on a four-pronged strategy: (1) several days' surface surveillance at Loch Ness; (2) several days' surface surveillance at Loch Morar; (3) research and logistical work at Loch Ness, Loch Morar, and some of the other Scottish Highland lochs (see Elizabeth Montgomery Campbell and David Solomon, *The Search for Morag*, Tom Stacy, London, 1972); and (4) assist any other research groups or individuals involved in cryptozoological fieldwork, if our time and resources permitted.

We both have had considerable experience in investigating aquatic environments. Meaney has had practical field experience at Lake Champlain (located in Vermont, New York, and Quebec) in 1981 and 1982, working with the Lake Champlain Investigation (LCPI) team in shore and vessel camera monitoring, as well as in scuba-diving operations. She also aided the Rochester Engineering Laboratories and LCPI in the deployment of side-scan and Raytheon fixed mode sonars at Lake Champlain. This was Meaney's first expedition to the "monster lochs" of Scotland. Zarzynski, as director of LCPI, has been investigating "lake monsters" since 1974: this was Zarzynski's sixth excursion to Loch Ness (others in 1975, 1977, 1978, 1979 and 1981).

NARRATIVE DESCRIPTION

We decided the best strategy to utilize was surface surveillance from shoreline vantage points, from our rented car at roadside laybys, and, if possible, from a vessel.

We will first briefly describe the freshwater bodies we visited in Scotland, which will be followed by a synopsis of our fieldwork at these lochs.

Physical Features/Sizes of Scottish Lochs Visited

- Loch Ness: By water volume, Loch Ness is the largest freshwater body in the British Isles; it is 22 miles long and 2 miles wide; its maximum depth is believed to be 975 feet (see Nicholas Witchell, *The Loch Ness Story*, Corgi Books, London, 1982), although this maximum depth figure is disputed by several other researchers.
- Loch Morar: It is 11 miles long and about 1½ miles wide (see Campbell and Solomon above); maximum depth is 1,017 feet, making it probably the deepest lake in Europe (see J. B. Sissons, *The Evolution of Scotland's Scenery*, Archon Books, Hamden, Connecticut, 1967).
- Loch Assynt: It is 6½ miles long; maximum depth is 282 feet (Tom Weir, *The Scottish Lochs*, Constable and Co., London, 1980).
- Loch Arkaig: It is 12 miles long, and has a mean breadth of one-half mile; maximum depth is 359 feet (see Weir above).
- Loch Sheil: It is 17 miles long (estimate from a U.K. ordnance map); maximum depth is 420 feet (see Weir above).
- Loch Quoich: It is 9 miles long, and 1½ miles wide at its greatest point (see Weir above); its maximum depth is 281 feet.
- Loch Oich: It is 4 miles long, with a one-fifth-mile mean breadth (see Weir above); maximum depth is about 133 feet (see Weir above).
- Loch Lochy: It is 10 miles long, with an average width of three-fifths mile; maximum depth is 531 feet (see Weir above).

Fieldwork

- August 7, 1982: Surface surveillance at Loch Lochy, Loch Oich, and Loch Ness: we used a 7 × 35 pair of binoculars, two 35 mm cameras with 135 mm, 80/205 mm, and 600 mm lenses, and a Nikon Super 8 mm movie camera with 8 × 1 power; the weather conditions were cool and the lochs' surfaces rather calm (no sightings).
- August 8, 1982: Surface surveillance at Loch Ness (Fig. 1); the weather was windy, and the loch's surface was choppy (no sightings).
- August 9, 1982: Surface surveillance was conducted from both shoreline and aboard the vessel *Kelpie*, piloted by Ivor Newby (Academy of Applied Science member); vessel rendezvous with Adrian Shine's team (Loch Ness & Morar Project), and their sonar vessel, *New Atlantis*; loch



FIG. 1.—Western end of Loch Ness, location of the town of Fort Augustus.

conditions were cool, windy, and the water was very choppy (no sightings).

- August 10, 1982: Surface surveillance at Loch Ness, and then an excursion to Loch Assynt for surface surveillance; the weather at both lochs was cool; windy and choppy waters (no sightings).
- August 11, 1982: Brief shore-watching sessions at Loch Ness, Loch Quoich, Loch Arkaig, and Loch Shiel; the weather was sunny, but windy (no sightings); we also made a trip to Dundreggan, located a few hundred yards north of the River Moriston in Glenmoriston, west of Loch Ness. Dundreggan means “Hill of the Dragon” (see Witchell above). Legend holds that Fingal killed a dragon at this spot, and that it was then buried there.
- August 12, 1982: Surface surveillance at Loch Shiel and Loch Morar; weather conditions were windy, and both lochs had choppy water (no sightings).
- August 13, 1982: Surface surveillance at Loch Morar after a hike of 3½ miles each way along a mountain footpath overlooking the north shore of Loch Morar: our 7-mile hike with cameras took us past Brinacory Island, toward Swordland, and back; camera watch aboard Loch Morar Superintendent Jim Penny’s sailboat on the western end of Loch Morar (Fig. 2); weather conditions were sunny, with some wind (no sightings).



FIG. 2.—View looking west on Loch Morar on a “sunny” day. At 1,017 feet, it is the deepest lake in Europe.

- August 14, 1982: Surface surveillance at Loch Morar and Loch Shiel; weather conditions were cool, with sunshine, and not much wind (no sightings).

The other days of our United Kingdom excursion were devoted to visiting Lake Bala (Llyn Tegid), a reputed “monster lake” in Wales, and visiting various individuals. Among them were: Jack Bruce, Keeper of the RAF Museum at Hendon, England (on the matter of the Loch Ness Wellington Bomber); Ivor Newby; Adrian Shine; Jim Hogan, of Caley Cruisers, Ltd.; Tony Harmsworth, Curator of the Loch Ness Monster Exhibition; David James, former Member of Parliament; Tim Dinsdale; Gordan MacKintosh, of the Academy of Applied Science; and Mrs. Basil Cary, of Strone.

RESULTS

Poor weather conditions plagued our field operations throughout most of the expedition. However, we were able to spend some time on camera monitoring, and we also were able to survey first-hand some of the other Scottish freshwater bodies in which sightings of unidentified animals reportedly occur, although they are not given the publicity of the Loch Ness sightings.

After the expedition, our thoughts closely echoed those of Peter Costello

(see Peter Costello, *In Search of Lake Monsters*, Coward, McCann and Geoghegan, New York, 1974), who stated: "The Loch Ness animals are not unique, either in Scotland or the world. The more attention given to reports from other places, the sooner the real existence of these animals will be completely established."

Nonetheless, of the Scottish lochs we visited, at least one should be considered for elimination as a possible habitat of a Loch Ness-like animal species. That body is Loch Quoich.

Although located in one of "the most inaccessible regions of Scotland" (see Weir above), and having a tradition of being the home of "water monsters" (see Campbell and Solomon above, and Constance Whyte, *More Than a Legend*, Hamish Hamilton, London, 1957), it is now a reservoir behind a 1,000-foot-high dam. The Loch Quoich reservoir "holds 12,500 million cubic feet compared to 8,345 million cubic feet in pre-hydroelectric days. The rise of 100 feet in level made the loch 9 miles in length, whereas it used to be only 7 miles in length, doubling its maximum breadth to make it 1½ miles. Two small dams at the western end prevent spillage to the Atlantic watershed" (see Weir above). Thus, it seems unlikely that the reservoir-loch could hold any Loch Ness-type animals today.

After studying the numerous accounts of sightings or legends of "water beasts" in Scottish waters, we have concluded that the cryptozoologist is confronted with the problem of trying to disentangle objective fact from Scottish legend. Campbell and Solomon (see above) summed this up when they wrote:

It is quite clear from the accounts collected already by Mrs. Whyte and others that there is a core of "misfits" among the myths, that these involve quite a number of lochs in the Western Highlands, and that hundreds of people have probably gone to their graves under the suspicion of romancing when they were telling no more than the truth.

FUTURE PLANS

We hope to return to Scotland to further investigate the legitimacy of claims that there are other Scottish "freshwater lochs from which sightings on the Loch Ness pattern have been reported" (see Campbell and Solomon above).

Only two Scottish Highland lochs, Ness and Morar, have been studied intensively. One can only wonder what evidence might have already been uncovered had one of these more remote and less scrutinized lakes been investigated with the same enthusiasm and scientific sophistication that has been undertaken at Loch Ness.

Book Reviews

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Les Derniers Dragons d'Afrique [The Last Dragons of Africa]. By Bernard Heuvelmans. Plon, Paris, 1978. 507 pp. 80fr.

This large work of more than 500 pages is the first in a series entitled "Unknown Animals of the World." What Bernard Heuvelmans hopes to do is to present as complete a picture as possible of the current status of cryptozoological studies and research. In this way, the essence of the vast documentation accumulated over 30 years by the "Father of Cryptozoology" will be accessible to a broad public.

This first book is devoted exclusively to the "dragons" of Africa. It begins with the giant serpents of North Africa, the snakes which emit strange sounds in Central Africa, and *Groot Slang* in South Africa.

The second and larger part of the volume is devoted to "amphibious dragons." It begins with a geographic overview, with statements by witnesses, and documents grouped by regions. The author then attempts to exclude the most obvious hoaxes, and to sort out the most significant points in each report. Then, in a chronological analysis, he attempts to establish the influences which affected both the description and the interpretation of the facts, and the manner of relating native traditions, including the deliberate invention of tall stories. The author then presents his own conclusions. For the "amphibious dragons," he identifies four different forms in Africa: a manatee, or related unknown species, a catfish, a machairodont species, and a sauropod.

Lastly, the final portion is devoted to the records on "flying dragons," giant unknown bats and pterodactyls.

This book, which contains much previously unpublished information, and which bears the strong imprint of the personality of its author, will not leave the reader indifferent.

One could challenge many of the analyses and conclusions reached by Heuvelmans. There is hardly any doubt that much mystification (such as, for example, the matter of the viper with giant horns in South Africa) has escaped his notice. Although the greater part of the data presented do not fall in this category, it nonetheless is always rather risky to draw excessively definitive conclusions from simple statements by witnesses, the limits of which are well-known, even when the author speaks in perfect good faith. The problem becomes still more delicate when it comes to second-hand

reports, even if obtained directly from witnesses. The differences to be found among the five reports of Sir Clement Hill's observations of the Lake Victoria *Lokwata* are very revealing in this regard.

In his conclusion on "amphibious dragons," Heuvelmans wonders, not without malice, about the reactions provoked by this book in "so-called authoritative circles." "Without a doubt," he states, "there will be those who find it hard to accept the possible existence of still unknown species of Sirenia or the Siluridae. The survival of Machairodont species would seem, of course, more subject to doubt, but nonetheless conceivable in view of the fact that man did, in the past, encounter felines in the Pleistocene Epoch But what will for a certainty cause these people to choke with indignation, as it always has done in the past, is the hypothesis of the vestigial dinosaur. What I would like to stress is that it is by no means scientific dictates which provoke such a reaction. It is of a strictly emotional nature."

Less than a century has passed since the beginning of the exploration of the heart of Africa, and it still remains extremely compartmentalized in many regions difficult of access. However, these several decades without concrete proof of the survival of such animals is beginning to have a weight much heavier than the 70 million years without fossil evidence. While no hypothesis should be excluded *a priori*—and that is indeed the very essence of cryptozoology—one must admit that time is not working in favor of the "last dragons of Africa."

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Searching for Hidden Animals: An Inquiry Into Zoological Mysteries. By Roy P. Mackal. Doubleday, Garden City, N.Y., 1980. 294 pp. \$12.95.

This volume is about those strange and wondrous sightings in which more is left to the imagination than is actually seen.

Readers are whisked along on an expedition from the frigid waters of the Arctic Pacific to a Florida beach, whence to a steaming swamp in Central Africa, to the upland valleys of the Himalayas, to small islands in the Indian Ocean, to oceanic deeps, to the jungles and pampas of South America, and finally returning home to explore the large lakes of North America. In our travels, we meet a variety of beasts, real and hypothesized: Steller's sea cows,

zeuglodon whales, giant octopuses, dinosaurs, and many others. For some of these animals, we have hard evidence of their past or present existence. For others, the evidence is supportive but not conclusive, and for still others the evidence is simply tantalizing and open to multiple interpretations.

Mackal mixes the confirmed animals with the unconfirmed ones. Such a presentation adds credibility to the existence of "hidden" or cryptozoological animals. Certainly Steller's sea cow meets all the criteria of a cryptozoological phenomenon, being both of unexpected occurrence in time or space—du-gongs and manatees are typically tropical—and of unexpected size and shape—several times larger than its other extant relatives. However, the verification of one of Steller's claims does not verify the other, the so-called "sea ape." Skepticism must remain, and remain ever alert.

Such skepticism is not always apparent in this book. Mackal's premise tends to be one of unswerving certainty. Exotic and unknown animals are the explanations for these clusters of unusual sightings. They are all presumed to exist, and a systematic gathering and analysis of data will ultimately reveal the identity of each "hidden animal." Although I cannot share his certainty, I do admire his fervor in examining and validating the data. It is this fervor that has produced a highly readable and fascinating book. In few other places can a reader delve into so many cryptozoological mysteries and discover the critical evidence for each. It is an excellent introduction to cryptozoology for the lay reader and scientist alike. However, I would advise all readers to remain skeptical, and not to be overwhelmed by Mackal's enthusiasm for identification.

Cryptozoology is becoming a legitimate area of research, and Mackal introduces the major phenomena that we have to investigate. However, we must accept his interpretations as only tentative hypotheses. These will be tested in the future against new evidence and through a reanalysis of the old evidence.

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Sasquatch: The Apes Among Us. By John Green. Hancock House, Saa-nich-ton, British Columbia, 1978. 492 pp. \$14.95.

This is one of the most important books on as cryptic a zoological population as one could expect to find. The book is a comprehensive update of

three earlier Sasquatch booklets by Green (*On the Track of the Sasquatch*, *Year of the Sasquatch*, and *The Sasquatch File*). There is much new material, and new thoughts by Green on the problems of Sasquatches and the hunt for them. For what it does, it is the most thorough book to date.

Green introduces the book by stating that he does not "believe" in Sasquatch, so the book is not for believers. This statement is a curious one, standing alone as it does, without further explanation, except that the book "... is the story of an investigation." I know that Green has become convinced, as the result of that investigation, that a population of giant hominoid primates survives in North America, that hundreds of Americans and Canadians have seen one or more alive, and that the animals often leave multiple large footprints (some in places almost inaccessible, some in people's yards). Even so, no scientific specimen exists to verify, with its museum number and label, that it once existed as a living animal. Green has records of footprints and/or sightings (usually both) in every U.S. continental state except Rhode Island, and in every Canadian province except Prince Edward Island, Nova Scotia, and the island of Newfoundland. While the reports came mostly from the Pacific Northwest, interesting areas of concentration of sightings were found in northwestern New Jersey, western Pennsylvania, and west-central Florida.

The book begins with a brief historical survey of "wild men" in literature and history, beginning with the Babylonians, but passing quickly over the usual Chinese and European sources given in other books. Instead, the author concentrates on 19th century North America to show that records of "hairy giants," while not numerous, were both widespread and consistent in that century, but were then (as now) ignored by professional biologists. Chapters 3-6 and 11-15 deal, case by case and in some descriptive detail, with the more important sightings and discoveries of footprints in this century, and into 1977. If one makes notes on these, as I did, the data accumulate impressively. Later in the book, I discovered that Green had already accumulated these data by categories, and had computerized them. These data were collected in large part by Green and Dennis Gates from on-site interviews with Sasquatch observers while they were on a tour of the U.S. and parts of Canada in 1976. Contrary to their expectations, they turned up numerous impressive reports of Sasquatches in eastern North America, which included anatomical details, behavior, and footprints matching those from the West. Seemingly, Sasquatches exist wherever considerable bodies of timber and brush occur, and where water is available.

Where the areas supposedly populated by Sasquatches adjoin settled human areas, people report them, and will probably continue to report them, on back roads, in orchards, in their chicken coops, and, as true already of one family, on their front porches! Even so, most police officers do not "believe" in Sasquatches, so many police departments (but not all, especially

after their own men have reported them) will conclude that witnesses saw bears, thus increasing the official local ursine populations remarkably.

A few significant observations of recent years by only a few people have been isolated in Chapter 23, but they seem out of place there by themselves. The remaining chapters are on a wide variety of topics: "wildmen" reported from other continents, particularly from the U.S.S.R.; Sasquatch-hunting expeditions and their failures; so-called Bigfoot research organizations which have often consisted of a membership little larger than a board of directors; the failure of legitimate research institutions to take any interest in Sasquatch; problems with the lunatic fringe; data on the Patterson-Gimlin movie film (including comparisons with a film taken of a slim human male, 6'5" tall, walking the same path as the Sasquatch in the Patterson-Gimlin film); distribution of Sasquatches relative to rainfall, and the discovery that almost all records are in areas of at least 20" of rainfall; footprints (but here one will want also to see the treatment of this topic by physical anthropologist and primatologist John Napier); the reasons for the lack of fossil evidence; supposed Sasquatch vocalizations; and Sasquatch swimming behavior (several of the animals have been observed swimming, including one reportedly seen very frog-like underwater).

Other subjects considered are the uselessness of statistical analyses on Sasquatch data until the valid sample sizes for the various possible categories are considerably larger; the difficulties with taxonomic determinations of isolated hairs; why a Sasquatch is not a human, even though possibly a hominid; why a Sasquatch should be collected (probably dead) for scientific study and to reverse scientific opinion as to their existence; and (Chapter 25) a good summary of what we know (as of 1977) about the physical characteristics, ecology, and behavior of the Sasquatch, with notes on variability.

The book's discussion of "Gentle Giants," which Sasquatches certainly are, will probably do little to change the general public concept, and that of the media, that Sasquatches today fit the role assigned to gorillas of the 19th century. Obviously, an ape-like, bipedal, hair-covered animal of large size and tremendous strength is a "monster" (and it has been so designated by various people who should have known better), and "monsters" are supposed to be ferocious, blood-lusting, and sex-crazed killers!

I am most favorably impressed with the accumulated wealth of information in Green's book, and the breadth and depth of thinking he has expressed. Even so, I have negative opinions about two of the chapters: I think out of place is the chapter "A Mystery in Stone," on the subject of the association of dinosaur tracks and supposed human footprints in early Cretaceous strata in the bed of the Paluxy River, Texas; while Green has made his point that, as with Sasquatches, the scientific establishment has refused to become involved with a topic it has not explained, my opinion

is that creationism and cryptozoology should not be mixed. In my opinion, the chapter entitled "Ivan," dealing with the furor over the Sasquatch events in Bossburg, Washington, in 1969–71, is substandard in comparison with the rest of the book. By presenting a mini-biography and a character study of a hoaxer (a producer of a film of a fake Sasquatch) as the focus of the chapter, including an element of admiration for the hoaxer, tacit approval of chicanery is introduced into the book. This detracts from the careful building of evidence in support of the existence of Sasquatches. Hoaxes do and will occur, and should not be ignored; but certainly they should not be presented approvingly, no matter how much of a charming rascal the hoaxer is.

The major results to emerge from all the turmoil in Bossburg, as I see it, are the anatomical analyses by Grover Krantz of a handprint and the footprints appearing to have been made by a crippled foot. If a faked film was produced (and it *was*), the casual reader will ask: "Why not also impressions of a hand and a crippled foot from the same place and time by the same hoaxer?" Green himself suggested the question, but gave no answer, even though the question may be answerable in part. Nor does Green identify the individual whose clever detective work exposed the hoax of the film when all others had been taken in, including Green himself.

This chapter is quite out of character, and I don't know why Green chose to write it the way he did. One has to go to another source (*Sasquatch*, by Hunter with Dahinden, 1973, pp. 150–173) for a more complete account, and also for the name of the investigator in the case.

I must emphasize that, in spite of the shortcomings in these two chapters, John Green's *Sasquatch: The Apes Among Us* is about the best book on the subject, although not supplanting some of the older works in some details.

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Sasquatch Apparitions: A Critique on the Pacific Northwest Hominoids. By Barbara Wasson, Published by the author, Bend, Oregon, 1979. 173 pp. \$6.95.

According to the author's preface, this book "is more for the sophisticated Sasquatch reader than for the novice I have been critical, even harsh with those in Sasquatch endeavors. I have done this to thrust the participants into more critical thinking and finer discriminations If the reader or

other Sasquatch seekers consider this unfair, perhaps it is. I feel it necessary to get the public's attention for their own analysis, as well as to upgrade criteria in investigation."

Since I am a novice when it comes to the esoterica of Bigfoot investigations (I am a marine biologist), I can view *Sasquatch Apparitions* only from the limitations of my ignorance; this might, however, permit a more objective assessment than any made by Wasson's fellow Sasquatch seekers. From this book, as well as other sources, I gather that the Bigfoot scene is characterized by much bickering, feuding, and backbiting.

Unfortunately, the cool detachment with which I approached my task was quickly eroded. The inconsistency in the author's prefatory statements—her book is "more for the sophisticated Sasquatch reader," but "I feel it is necessary to get the public's attention"—is only the first indication of many exasperations to come.

In the first chapter, titled "The Oregon Coast Range," Wasson relates, with a plethora of largely irrelevant information, how she came to view some purported Sasquatch tracks on the grounds of a shingle mill at Reston, Oregon. "They measured, from heel to furthest toe, eighteen inches and the plaster cast measured up to 19 inches My companion sneaked in a plaster cast while I was interviewing and the plaster was quite thick." There are some obvious problems here. Why was the cast an inch longer than the footprint? Was the "sneaked-in" plaster cast the one she has just alluded to? What is the implication of its being "quite thick?"

This is followed, apparently in the spirit of scientific thoroughness, with almost two pages of excruciatingly detailed information on the region in which Reston is located—the topographic and manmade features, the geology, the temperature and rainfall, and the flora and fauna (including the names of 37 kinds of trees and shrubs). The chapter ends with two accounts of reported Sasquatch sightings in this area.

In the second chapter, Wasson discusses some of the "classic reports." Here one begins to understand what she meant when she said that this book is for the sophisticated Sasquatch reader. People and events are alluded to, but for the most part the people are not introduced (that comes in the next chapter), and the events are not described. For example: "I suspect Bob Titmus's expertise from his field qualifies him better than the layman, but I do not know Titmus. If I believe Bob Gimlin, I believe it all. I have to. There is the man, the film, and others who saw the tracks at the site." To understand what this is all about, the novice must consult one of the books listed among the references at the end of the chapter.

In the longest chapter, Wasson describes the investigators—Major, Minor, and Other. Although she puts three individuals in the Major category, there is, she says, really only one, Rene Dahinden, a man for whom she clearly has unbounded admiration. Much of the section on Dahinden is devoted to

his physical features, dress, walk, personal magnetism, emotions, endurance and persistence, and life history. The rest consists largely of obscure (to the novice) allusions to Dahinden's relationships with other investigators, his legal battles, and his frustrations.

Wasson's rambling accounts of other Sasquatch devotees also include physical descriptions. Of one, "His features are coarse and pronounced, and he is not especially good looking." Of another, "Roger: slim, dark, moderately handsome, short, lively, a muscular man" (though, earlier: "I never met him"). And still another, "He is a handsome man, soft spoken, with a casual posture and well dressed."

Whatever the looks of her subjects, however, Wasson's opinion's of many of them are not favorable. In her section on John Green, the author of several books on Sasquatch, Wasson takes him to task with reproachful remarks, usually in parentheses: "(Yes, John, you do.)"; "(Sorry, John, I had to say that.)"; "Honestly, Mr. Green, honestly!"

This reader's exasperation threshold was further lowered by such statements as: "Unfortunately, I cannot recollect all the essential details"; "There were further exciting details I did not write down"; "I enjoyed it [a discussion] very much. I was not taking notes, however."

The book includes a chapter on the 1978 Sasquatch conference sponsored by the University of British Columbia, which Wasson attended. One chapter consists of the paper she presented, and in another, titled "Physical Evidence," she gets in some more licks at other investigators: "(Oh, Napier!)." At the end are three appendices. The first is a "Study of Police Officers' Opinions of Witnesses" (results inconclusive), the second contains the abstracts from the Sasquatch conference, and the third is a "Statistical Analysis of Sasquatch Reports."

This book tells more about its author—a clinical psychologist—than it does about Sasquatch investigations. Whether it will persuade some of Wasson's fellow investigators of the error of their ways, whether it will upgrade criteria in investigation, and whether it will get the public's attention, all seem doubtful.

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The Scientist Looks at the Sasquatch (II). By Roderick Sprague and Grover S. Krantz (Eds.). The University Press of Idaho, Moscow, Idaho, 1979. 195 pp. \$7.95.

The first edition of this book, published in 1977, contained papers by Grover S. Krantz, Roderick Sprague, Bruce Rigsby, Wayne Suttles, Gordon Strassenburgh, and Dmitri Bayanov. This second edition, published as *Anthropological Monographs of the University of Idaho No. 4*, contains additional papers by J. E. Beckjord, Ron Westrum, and Richard Beeson.

All these papers were originally published in the *Northwest Anthropological Research Notes* after Roderick Sprague, the editor, stated that he would publish "... any reasonably scientific paper dealing with the Sasquatch phenomenon." Most of the papers are not only reasonable, but also surprisingly scientific, considering that they deal with animals for which there are few hard data.

Co-editor Krantz analyzes the anatomy of Sasquatch footprints and handprints. Some of these prints were obtained from a man who also made a movie film which, in the opinion of all who viewed it, is a fake. This is not to suggest that the movie was made for any pecuniary reason. It was probably made to test the faith of the viewers. If the movie is a fake, then his prints are at least suspicious. Krantz argues that the Sasquatch foot is flat, and bases his conclusion on the examination of the print, and on the estimate of the weight by the purported witnesses. These data are, of course, only estimates. However, in a new book on Sasquatch which is in press, suggestion is made that the foot is arched, which makes more sense to this reviewer. A very large weight would probably result in the evolution of larger individual bones, but the overall structure of the foot would probably show the arch, and it would be more flexible.

The weight and height of a Sasquatch reportedly killed by a hunter, and Jacko, a Sasquatch-like being captured in 1884 (according to one newspaper), are presented by Krantz in a curve on page 81. However, after many years, no evidence has been presented that such an animal was actually killed, while the Jacko story was most probably a hoax, since it was not mentioned in any other newspapers of that period. If these two examples are eliminated from the curve, then that leaves only one weight estimate, from the Patterson-Gimlin movie film, in which case the curve should be eliminated altogether. Krantz may be correct in his ideas, but more examples are needed to clarify the issues.

Rigsby and Suttles discuss the names of Sasquatch among the northwest coast Indian groups. There are a dozen such names among Indian tribes, and it seems that not all of them are yet recorded. What is very interesting is that Sasquatches are said to communicate by whistling; this is also men-

tioned in other parts of the world. Communication by whistling is also known among humans; some villagers in the mountainous areas of Turkey do so.

While most North American physical anthropologists interested in Sasquatch think that, if it exists at all, it is a descendant of *Gigantopithecus*, the Soviet investigators suggest that Neanderthals are the ancestors. Strassenburgh is alone in the opinion that Sasquatch is a descendant of *Australopithecus robustus*, the larger and supposedly non-meat eating australopithecine.

Beckjord writes that Sasquatches should not be killed for scientific reasons, while Bayanov presents the arguments for such beings in the Soviet Union. Westrum discusses the opinions of scientists about Sasquatch, based on questionnaire results.

Beeson discusses certain aspects of Sasquatch reports which seem to contradict our knowledge of other primates. For example, though Sasquatch is often mentioned as being nocturnal, or at least that it has no problem moving about at night, most other primates are diurnal. Practically all nonhuman primates avoid water, while Sasquatch is mentioned as being an excellent swimmer. Humans have lost most of their hair, and even apes have reduced hair in some parts of their bodies, but the Sasquatches are described as being hairier than known apes. The most puzzling aspect is that only the human females among the primates have large breasts. Darwin explained this evolutionary development by selection of males who chose only females with large breasts for mating. But why are female Sasquatches reported to have large breasts? It is difficult to believe in a natural selection explanation for Sasquatch breasts.

This is certainly one of the most scholarly books to address and evaluate the Sasquatch phenomenon. We should be thankful that the University of Idaho has seen fit to make all this information available to future investigators.

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Bigfoot: A Personal Inquiry Into a Phenomenon. By Kenneth Wylie. Viking Press, New York, 1980. 268 pp. \$14.95.

There are good books and bad books about Sasquatch. This one holds the distinction of being both. On the one hand, it makes a number of useful

points; but, on the other hand, the book simply cannot be a good overall assessment, since the information on which it is based, and the thinking that went into it, are too thin. What the book badly needs is depth.

The author presents a host of interesting details. He has read a surprising amount on the subject, and talked with many—although not all—of the principal figures in Sasquatch research; an interview with Grover Krantz is notably lacking. Wylie, who holds academic credentials in African studies, has done some fieldwork and interviewing of Sasquatch witnesses—but largely in Michigan, rather than Oregon, Washington, or British Columbia.

Those who expect a large number of Sasquatch case studies in the book will be disappointed. There are some (it is evident that Wylie believes they represent either hoaxes or mistakes), but only in Michigan, a state where good Sasquatch evidence is rare or nonexistent. (I, like the author, live in Michigan.) He rightly emphasizes how easily people delude themselves or are deluded by others into perceiving things that are not really there. He deals frankly with many of the problems that confront amateur efforts to investigate anomalous animals, and the book is a useful corrective to more sanguine views about the accuracy of testimony and the honesty of witnesses. But he does not go into the heaviest cases in the depth that one would like, even though he evidently has a flair for detective work.

His detailing of discrepancies in the Patterson-Gimlin movie film case is suggestive; one would also like to hear Gimlin's comments, and those of others familiar with the case. One may wonder, in fact (if the author did as much traveling in the Northwest as he claims), why he talked to so few Sasquatch witnesses, since he evidently talked to a large number of others who did not think much of such accounts. He is certainly *well-read* on Sasquatch, but the absence of more personal case studies is surprising.

Probably the most valuable contribution in the book is the debunking of Wayne King's "Michigan Bigfoot Information Center," which he suspects of being a sham. He may be right, although one should first like to get a look at King's files. I know of one case in which King promised confidentiality to witnesses, and then proceeded to give the details to the newspapers.

What I personally found disconcerting about the book was its chatty, off-hand quality. This comes through particularly in his portraits of leading figures in Sasquatch research, some of which I found agreed very little with my own impressions. This casual approach, although easy to read, diverts the author from larger and more precisely formulated scientific questions about anomalous hominoids, and prevents his marshaling of the evidence in a tight, logical manner. Although his treatment of many of the individuals is sympathetic, he often makes too cursory an examination of their views and their reasons for them. To prove his points, he often slips into loaded language, rather than closely reasoned arguments. A slight air of snobbish superiority pervades the book.

This volume is useful for the information it does provide, and for many of the author's worthwhile insights into the psychology of testimony and fraud. Yet I found it difficult to escape the feeling that a hard, central core is missing. Perhaps this is ultimately due to the author's belief that there cannot be a Bigfoot, and to my own that there probably is.

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Manlike Monsters on Trial: Early Records and Modern Evidence. By Marjorie Halpin and Michael M. Ames (Eds.). University of British Columbia Press, Vancouver, 1980. 336 pp. \$24.95 (Canadian).

In May, 1978, a conference on "manlike monsters" was held at the University of British Columbia. This constituted a major milestone along the road to serious scientific treatment of this subject because it brought together many competent scholars who had been studying these so-called "monsters." In addition, many nonscientists who had studied the same subject were there, mainly to see who the scientists were, and what they had learned that might support their own beliefs.

The major virtue of this conference was that it brought so many scholars out of relative obscurity to meet one another, and to find out that they were far from alone in their interests and opinions. A somewhat less desirable result was that many of these scholars presented papers that had little or no bearing on the central subject of the conference, but received attention and publication nonetheless. Even less desirable was the presence of many "true believers"—amateurs who often had little scientific knowledge, but were convinced that Sasquatch was real and should be generally accepted. Worst among these was one individual who exhibited a large amount of data that were unverifiable, inconsequential, or false—an effort that was perhaps deliberately calculated to make the entire investigation appear to lose credibility.

The ultimate result of the conference, however, was that it helped to move the investigation of bipedal "monsters" such as Sasquatch into the realm of science, and out of the hands of the lunatic fringe.

Majorie Halpin and Michael Ames deserve much applause and respect, not only for the work of setting up the conference, but for having had the courage to attempt it at all. And to top it off, they saw through to publication the volume that recorded much of what transpired there.

Manlike Monsters on Trial includes 14 lead-in pages, 20 plates, and 336 numbered pages. Within this, there are 333 pages of substantive text. This text consists of 24 items—a preface, an epilogue, a specialized bibliography, and 21 papers from among the conference presentations.

Many of the presented papers were not included in the book, and this created some ill-feeling on the part of those whose works were excluded. They had worked under the impression that all accepted conference papers would be published. Perhaps the most conspicuous omissions were the late Carleton Coon's keynote address, the impromptu (but recorded) debate on the pros and cons of killing one of these hominoid creatures, and the discussion that accompanied the showing of the Patterson-Gimlin movie film.

There are 24 published participants, and by chance this equals the number of papers (some were joint authorships, and some writers contributed to more than one article). These participants represent a high level of scholarly status. Eight are full professors, five associate professors, four assistant professors, two at lower levels, and one unspecified. Two contributors are non-teachers, and two are not employed in academic fields. All the published contributors are American or Canadian, with the latter being almost half of these. (There is no breakdown for all those who attended the conference, but my estimate is that laymen outnumbered scientists, and that these laymen were overwhelmingly American.)

A major question that the conference dealt with was whether there are actual "manlike monsters" out there in the real world. The published participants can be grouped into three opinion categories on the basis of their clear statements or by strong implication. Some take a favorable stand, others maintain a strict neutrality, and the rest are skeptical. In terms of the book's contents, these three opinions break down as follows:

	Number of articles	Total pages	Percent of text	Average pages per article
Favorable	5	50	15	10
Neutral	9	135	40.5	15
Skeptical	10	148	44.4	14.8

Of those indicating a favorable opinion, the most explicit is clearly John Green. He is Canadian and nonacademic, yet is one of the best-known authorities in the field. A measure of Green's prestige is reflected in the number of times his work was mentioned in other articles—40 times, compared with 24 times for the next highest, an academic person.

Others who clearly indicated a favorable opinion are Ron Westrum, Roderrick Sprague, George Gill, and the team of Kirilin and Hertel. Privately, I know that a few others favor the physical reality of unknown hominoids

more strongly than they state in their articles. (These opinions were easily elicited because this reviewer is well-known for his favorable opinion concerning Sasquatch.)

It is interesting to note that the "favorable" articles are short—averaging only two-thirds as many pages as the "neutral" and "skeptical" articles. One gets the impression that certain authors are free to come straight to the point, while others are obliged to verbally dance around the subject at greater length. Maybe the nature of their material requires this difference, but I doubt it—the contrast in lengths is too consistent.

No comparable figures are available for all the papers that did *not* appear in this book. From my observation at the conference, and from later reviewing many of these papers, I would judge that the omitted works are far more in favor of Sasquatch reality. It is often not clear whether these papers were rejected for their quality (sometimes poor), or for the opinions of their authors.

It is not surprising that many contributors failed to make clear, affirmative indications of their opinions as to the reality of the Sasquatch. If anything, it is surprising that so many did come out in favor of its existence. To assert such an opinion can be dangerous to one's academic career; I can state this from personal experience. There is a justified fear that employment might not be continued, raises and promotions may be denied or delayed, and working conditions otherwise affected in an adverse manner.

Most of the scientific establishment will have nothing to do with problems like Sasquatch. This is only partly because of the lack of definitive evidence. It is also because of the negative public reputation that Sasquatch hunting has already acquired. This results from the wild tales of the enthusiasts, and the ill-informed support by the "true believers." Many open-minded scientists prefer to remain silent or neutral rather than risk being equated with this rather vocal "lunatic fringe." Some of my colleagues who are critical of my interest are quite unaware of the careful investigations that have been made. Instead, they base their opinions on the more public, and often absurd, pronouncements of this "lunatic fringe." As a result of the Vancouver conference, and the volume *Manlike Monsters on Trial* which followed, this problem should now become somewhat relieved.

Returning to the book itself, before waxing too eloquent on its virtues I must register my major complaint about it. This most distressing feature was its relative lack of relevance to the stated subject. As I subjectively evaluated the articles, some were directly pertinent to "manlike monsters," some were partially pertinent, and others did not relate to the subject at all. As with the question of authors' opinions, this breakdown is as follows:

	Number of articles	Total pages	Percent of text	Average pages per article
Pertinent	10	101	30.3	10.1
Semipertinent	5	92	27.6	18.4
Nonpertinent	9	140	42.0	15.6

By page count, less than one-third of the book dealt directly with the subject, and almost one-half of it had no apparent relevance at all. This selection for publication does not represent the emphasis at the conference itself; the rejected articles were generally more related to the central theme. This editorial selection clearly was from the point of view of properly presented and written material, often disregarding its pertinence. The articles that were omitted may have been more to the point, but they were, it must be admitted, mostly of lesser literary quality. One might suspect that this form of selection is related to the previously noted selection against papers in which the authors expressed belief in the reality of the creatures. I personally suspect this was not just a literary selection, but one that also tends to make the entire work less controversial. In the present climate of opinion, it was necessary to present a somewhat conservative or orthodox profile. Had the book represented the actual distributions of favorable opinions and pertinence of material, it might have run some risk of being classed with the literature of the "lunatic fringe."

Some brief comment on those ten most pertinent articles is in order here:

1. Halpin and Ames give a preface that fairly introduces the subject and the conference. They play the correctly neutral role of noting the diversity of opinion and the lack of definitive arguments for either side on the question of physical reality.

2. Ron Westrum writes on the reporting of scientific anomalies. In a nutshell, an anomaly is a phenomenon that is "socially unacceptable," so the scientist has the problem of whether or not to report such observations. An apt analogy is the abrupt acceptance, just a century ago, of the physical reality of meteorites.

3. Roderick Sprague describes and illustrates some aboriginal stone carvings from the Columbia River area that look like ape-like heads. Zoologists who did *not* know their source unanimously declared them to be representations of nonhuman, higher primates; those who *knew* the source insisted they must be something else!

4. John Green asks and answers: "What is the Sasquatch?" From his extensive files of reports, he summarizes them as large, solitary, hairy, of

human proportions, bull-necked, omnivorous, nocturnal, less active in winter, and often swimmers. Also, he notes some consistent absences, such as no speech, no accurate throwing of objects, no use of fire, no tools, no "home" (even caves), and no fear of guns. He concludes that the Sasquatch is (1) not human, (2) not normally dangerous, and (3) not endangered. These conclusions are at variance with those of some of the enthusiasts.

5. Wayne Suttles investigates the "Testimony of Tradition" among Northwest Coast Indians. Their "myths" neither prove nor disprove physical reality, but this is not an irrelevant point. If there really is a Sasquatch, then our understanding of the origin of certain stories will have to be re-examined.

6. John Colarusso gives "Ethnographic Information on a Wildman of the Caucasus" from native informants, now far removed from the source. The picture is of a half man-half animal, one that does not fit the fully animal, and much larger, creature reported from North America.

7. George Gill reports a possible "Population Cline . . ." of Sasquatch body sizes that correlates with latitude. His data show increasing size to the north, following Bergmann's Rule, but John Green's data do not seem to support this conclusion. More study is suggested for this point.

8. R. L. Kirlin and Lasse Hertel submit their analysis of the Alan Berry sound recording that is purported to be of Sasquatch origin. They conclude that, if the tape is legitimate, there are two voices, and one would seem to have a vocal tract far longer than is normally encountered in humans. They do not rule out the possibility of prerecording, but consider it unlikely. (See my comments below.)

9. Vaughn Bryant and B. Trevor-Deutsch discuss some analyses of hair and fecal samples. They are unable to make positive (Sasquatch) identifications for any specimens they have examined. In their opinion, hair analysis is the more promising of the two kinds of evidence.

10. The book ends with a bibliography by L. G. M. Ruus, covering the whole field of "manlike monsters," with some emphasis on Sasquatchery. Any researcher in this area will find this extremely valuable for background material about previous studies and speculations.

These ten articles are really the meat of the book, and, incidentally, they include the five in which the authors indicate a favorable opinion about the creatures' existence. The impact of some of the less directly pertinent articles will be discussed shortly.

It should be noted here that the Kirlin-Hertel analysis is based on a tape of very questionable origin. While at the conference, I was approached by the two men who had taken Alan Berry to their hunting camp in the Sierras of California, where the tape was made. They wanted to show me photographs of the camp, and have further discussions in their rooms. John Green and Carleton Coon joined me for this visit. Their description was of a virtually inaccessible, totally undiscoverable camp; the pictures showed giant

footprints in the snow all over the area. Unfortunately, the footprints were of a blatantly fake design that I've encountered before. When I pointed this out, the discussion became somewhat strained, and was soon terminated. Perhaps I should not have been so hasty, and thereby found out what kind of game they were up to. This does not prove that Berry's recording is not real, but it certainly takes away much of the "ring of authenticity" that it once seemed to have.

A number of articles, which at first glance seem to show little or no pertinence to the central theme, nonetheless may have some indirect bearing. Here I refer mainly to the contributions of Jeffrey, Dickason, Preston, Fogelson, Buckley, and Halpin's second item. These collectively account for 35 percent of the text, and average almost 20 pages per article. They all deal with human conceptions of monsters, disregarding the question of their reality (or even denying it), and show how they are really dealing with the concept of what is human.

A common interpretation is that the human condition is more sharply defined by contrasting it with something that is only slightly less than human. Given the wide gap between ourselves and any generally accepted animal, some method of narrowing this gap is necessary to focus in on just exactly what is human, as opposed to just nonanimal. Intermediates of various kinds are introduced—lower hominids, higher animals, hybrids, outsiders—all of which compel us to be more exact about what we mean by the human condition. These intermediates tend to bridge the gap between humans and animals, yet at the same time serve to emphasize what makes us distinct in our own minds.

I cannot resist the temptation here to comment on two of these non-Sasquatch monsters. The Witigo (or Windigo) of the Algonkians of Eastern Canada are supposedly men who have once eaten human flesh, and have now turned into semihuman creatures living solitary lives. This sounds like no more than a myth that tends to discourage cannibalism, no matter how much individuals may be tempted in their difficult lives. The idea (however unlikely) to these people is that such an act leads to the most undesirable, and irreversible results.

The Stoneclad giants of eastern U.S. mythology are not really subhuman, just different. They sound more like distorted versions of Scandinavian armed men (the powerful finger representing a sword) who were once encountered by a few North American natives. Such descriptions could spread and become the physical referent that serves as background for stories of more immediate cultural importance.

Another general observation follows from these Indian accounts, and from others around the world as well. A common thread in most of these is that something exists to fill the intellectual gap between man and animal. Perhaps this serves to close this gap and make us feel not quite so alone, and so

relieve the anxiety of this isolation. Western peoples show the same tendency, as in their recent enthusiasm over the reported human-like intelligence of dolphins and chimpanzees. Whether these intelligent behaviors are real or not, is not the point, but rather that they are so readily believed with such little evidence.

Similarly, John Green has long noted a North American tendency to attribute human or semihuman characteristics to Sasquatch. In reality, the straight accounts of encounters include only animal behavior—nothing human at all, except perhaps in anatomy. It is only in the interpretations, and in second- and third-hand reports, that human-like qualities appear. Many people simply *want* them to be more than just animals, perhaps in order to close this intellectual gap between us and the rest of the natural order.

Reports of semihuman behavior by these “manlike monsters” does not automatically mean they were invented, but it does indicate that something probably has been exaggerated or distorted. (While this rule-of-thumb seems to apply to North American monsters, it does not necessarily apply to those from other parts of the world.)

Manlike Monsters on Trial published only part of what was presented in Vancouver in the Spring of 1978. The conference itself tapped only some aspects of the whole problem. Exactly how big the problem is, and what subjects are really pertinent, remain to be established. Whether the Sasquatch is a biological reality is still unproven and it remains to be seen how important this reality (or nonreality) will turn out to be.

One of these shortfalls will soon be corrected with the publication of many of the Vancouver conference papers that were omitted. Vladimir Markotic and I have gathered these, and some original papers, for a new book with the tentative title of *Unknown Hominoids*. (As the reader may have already guessed, both Markotic and I presented papers for the conference, which were not included in the subsequent volume.)

That the conference was less than perfect is hardly a valid criticism—it happened, and it was the first. There has been some discussion about a possible second conference, but nothing has been decided yet. One of the problems is how to avoid incompetent presentations that tend to discredit scientific investigations.

The remaining problems, concerning the true range of the subject and the physical reality of the “monsters,” still remain unsolved, and with no presently obvious means of settling them.

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